

Fig. 1

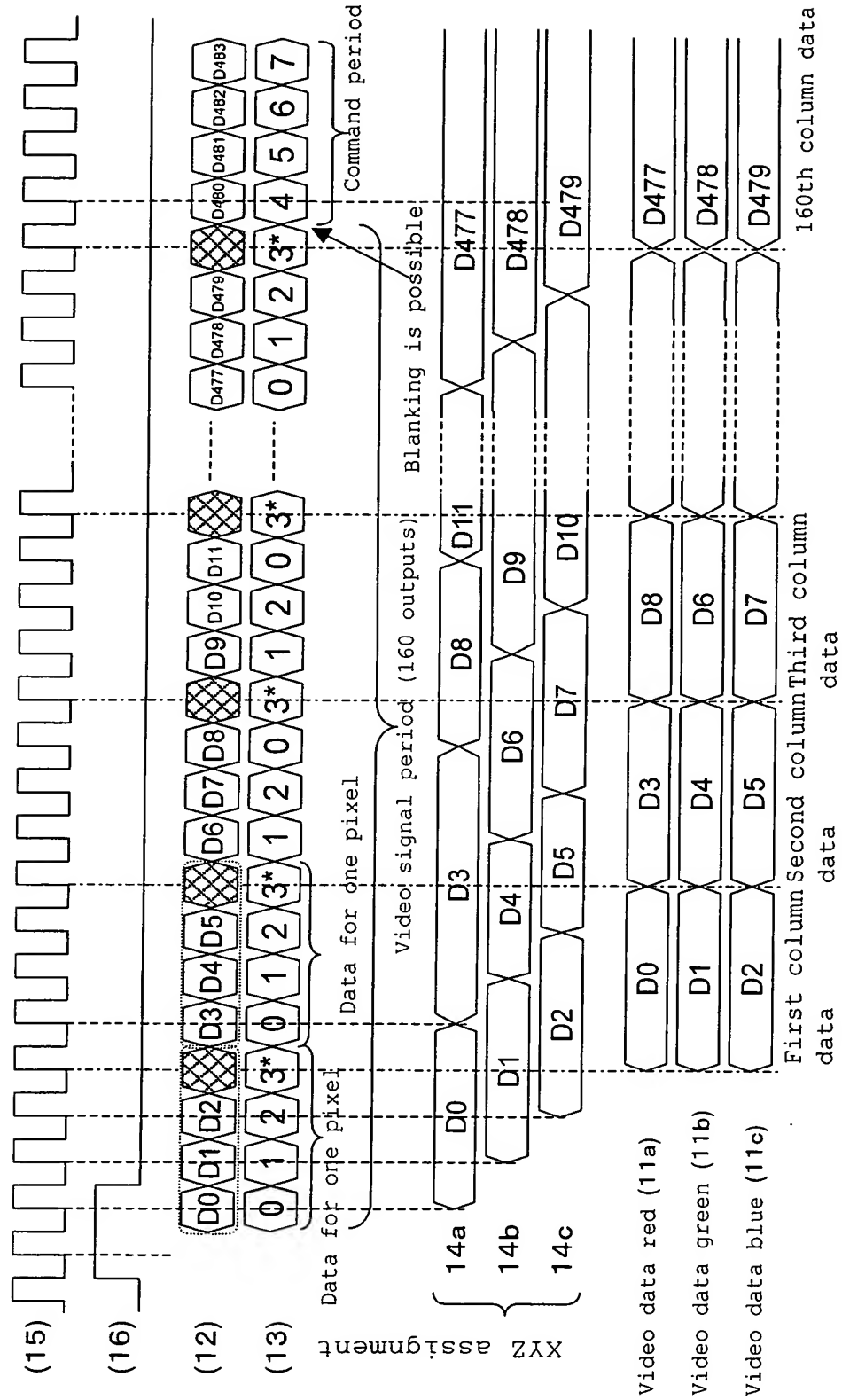
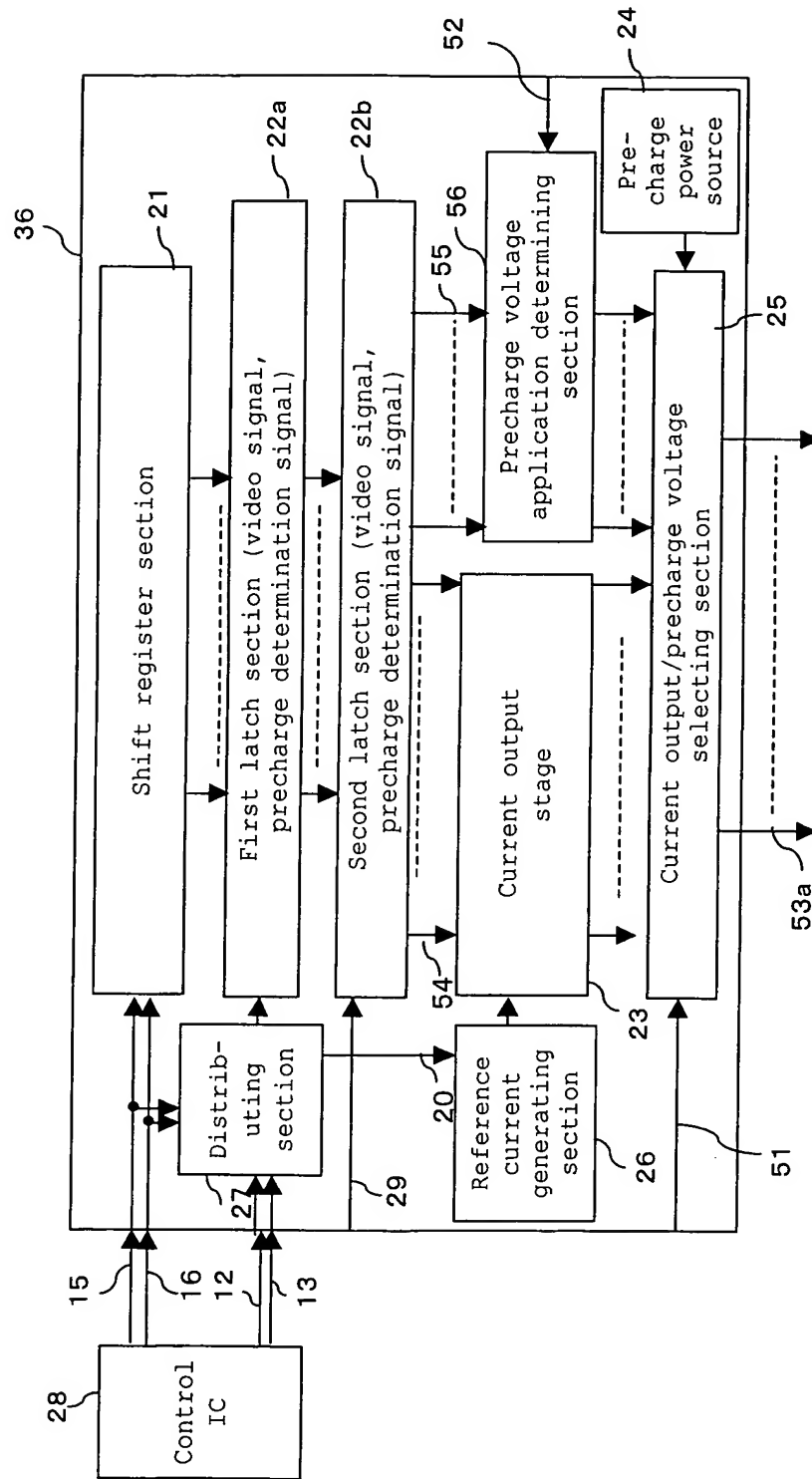


Fig. 2



3/190

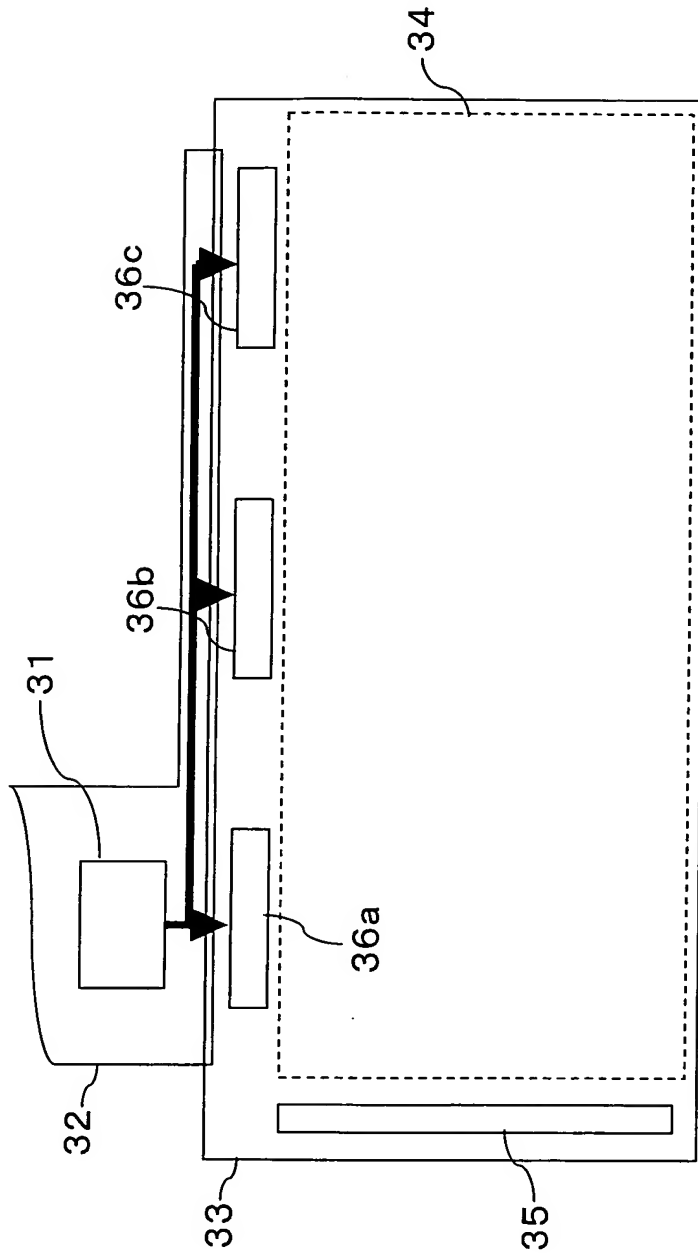


Fig. 3

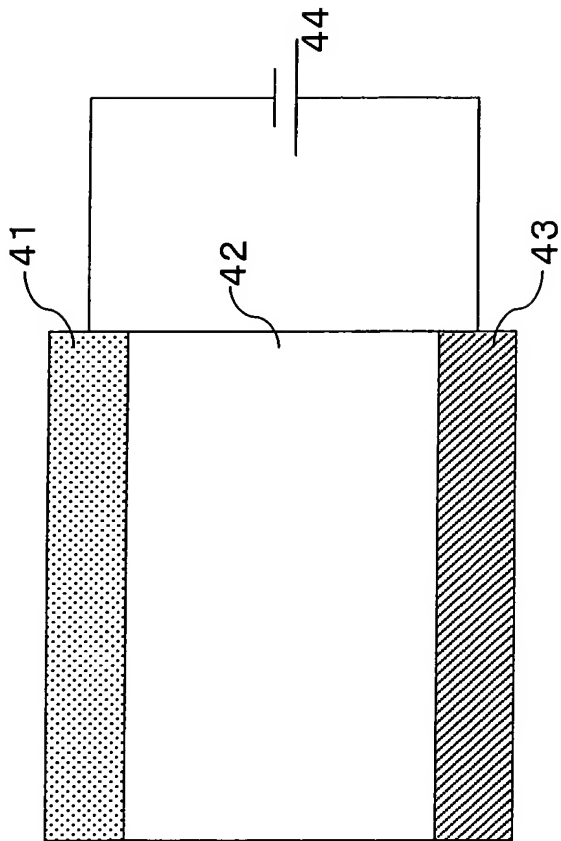


Fig. 4

5/190

Fig. 5(b)

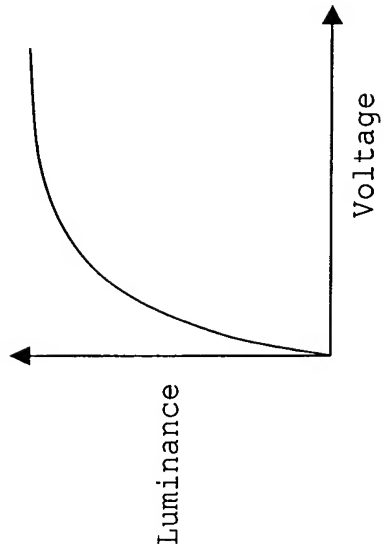
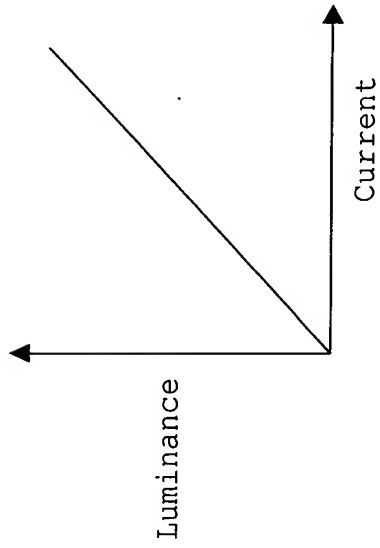
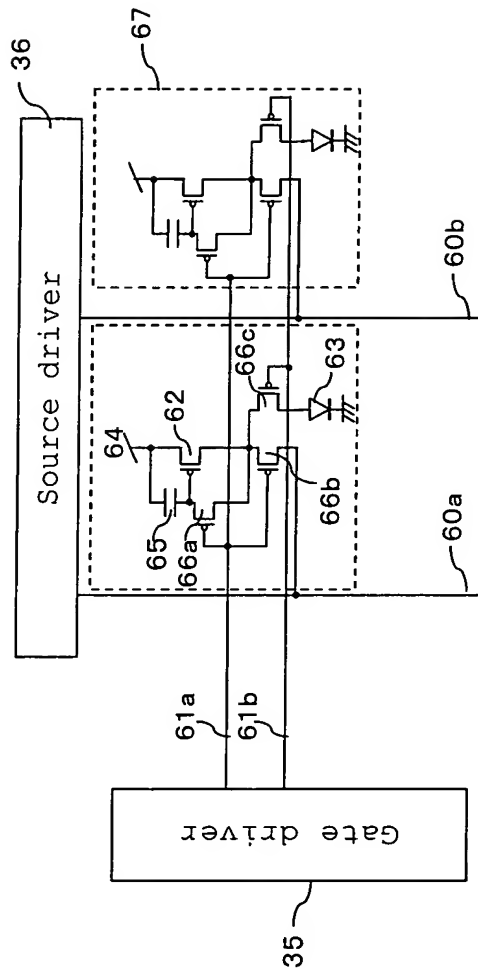


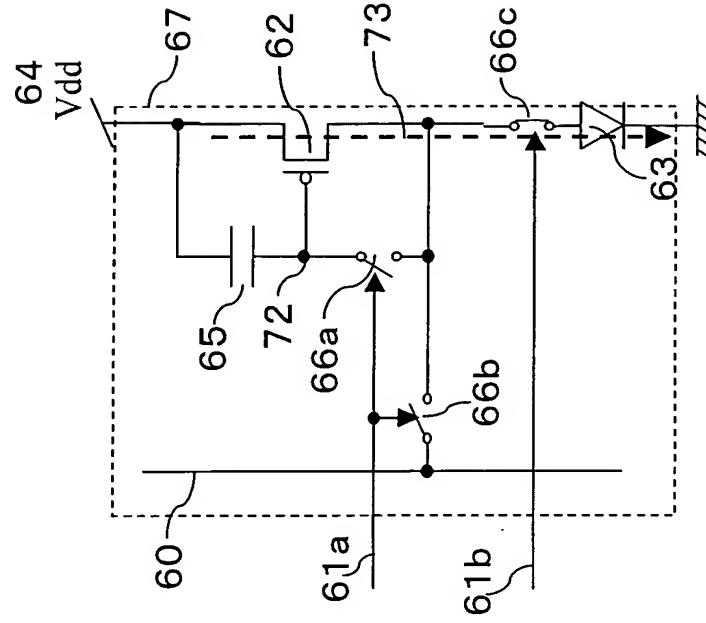
Fig. 5(a)



6/190

Fig. 6





8/190

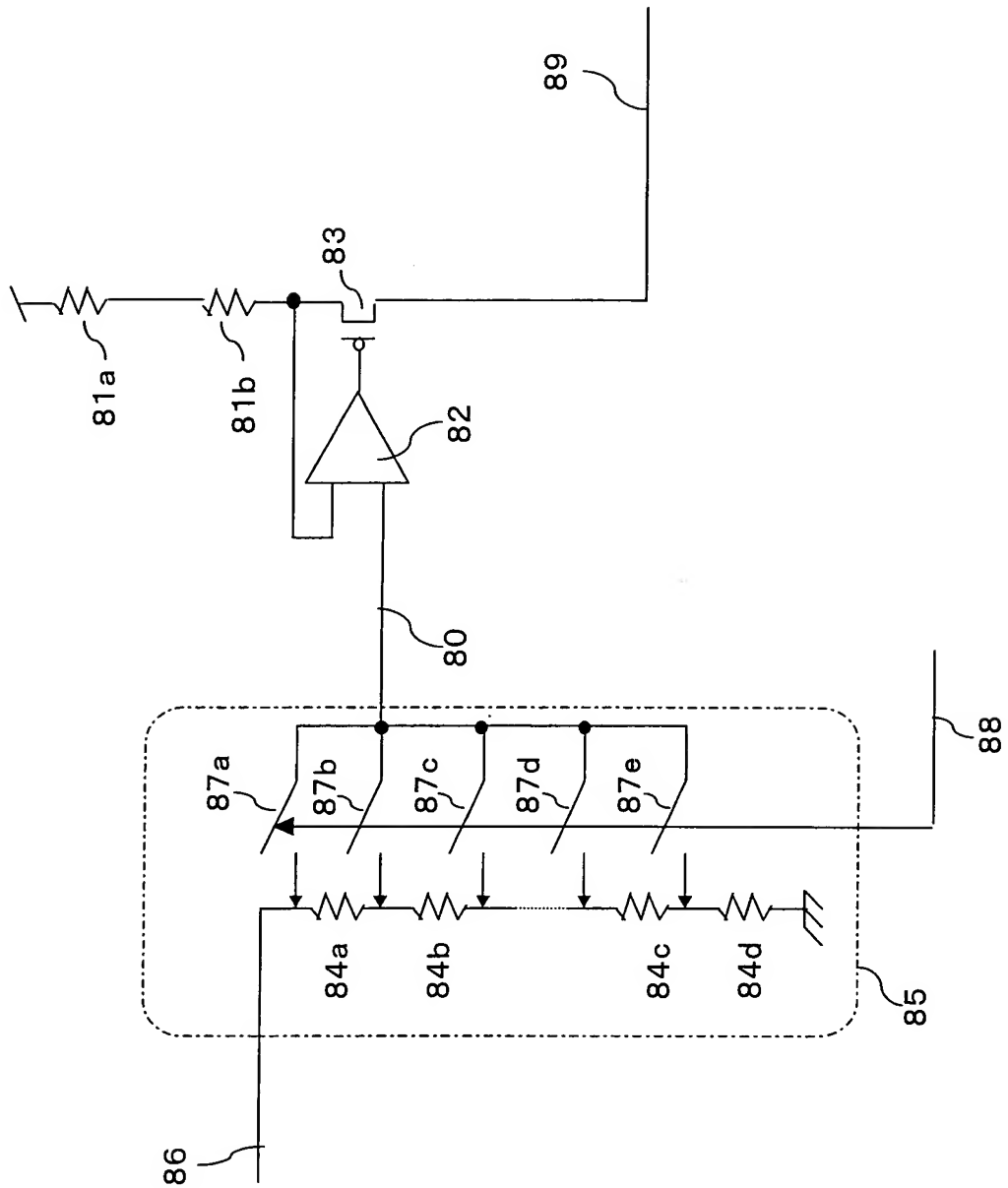
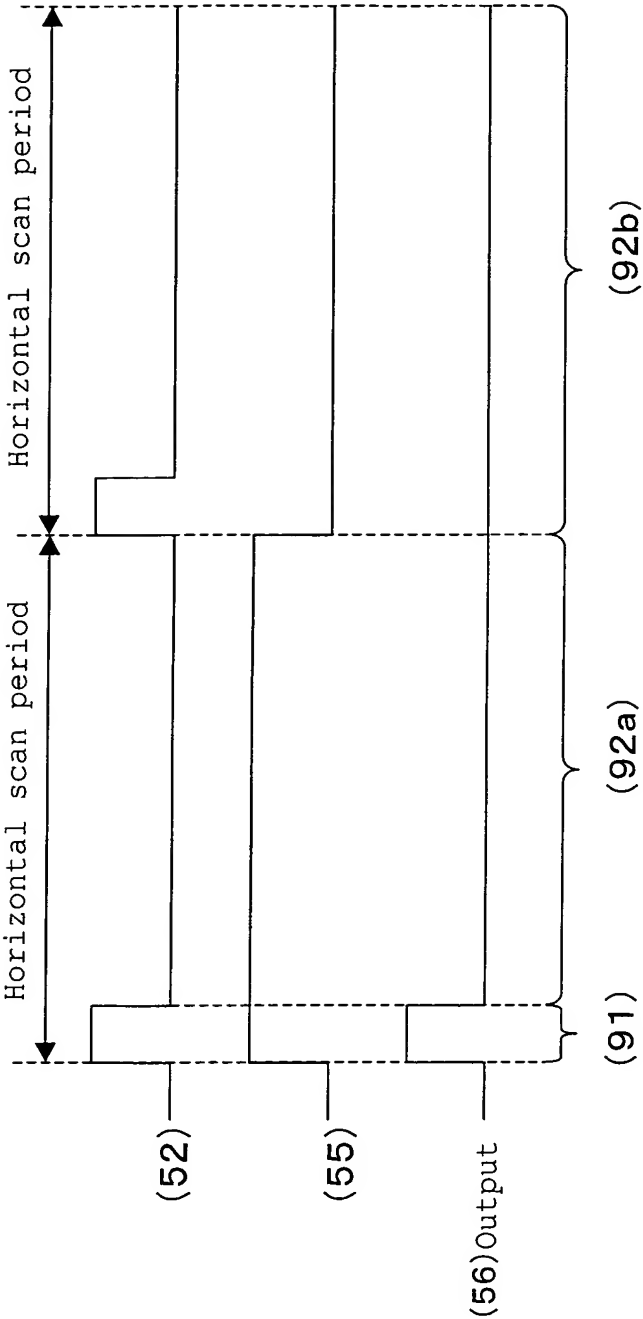


Fig. 8

Fig. 9



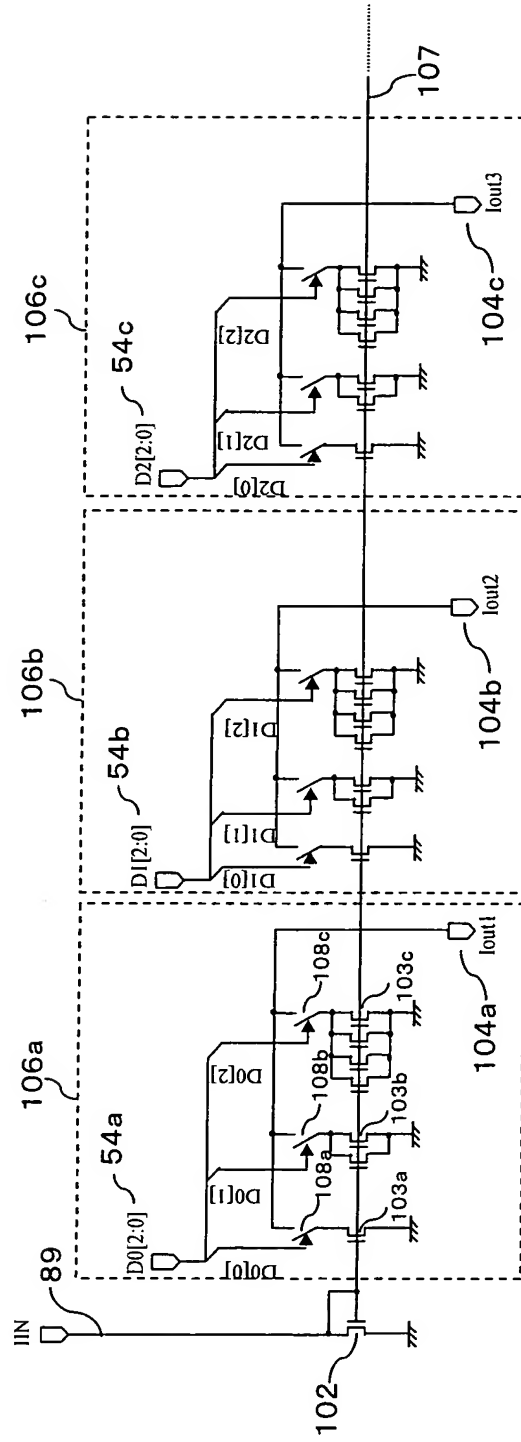


Fig. 10

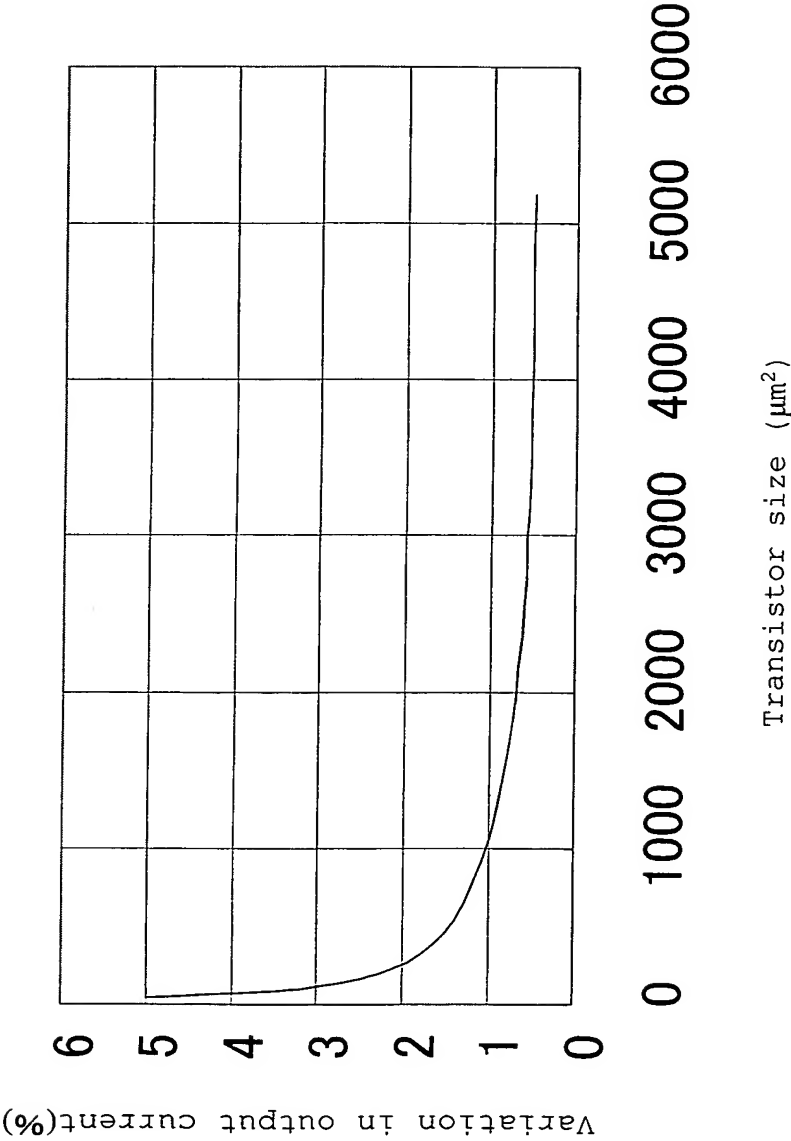


Fig. 11

Fig. 12 (a)

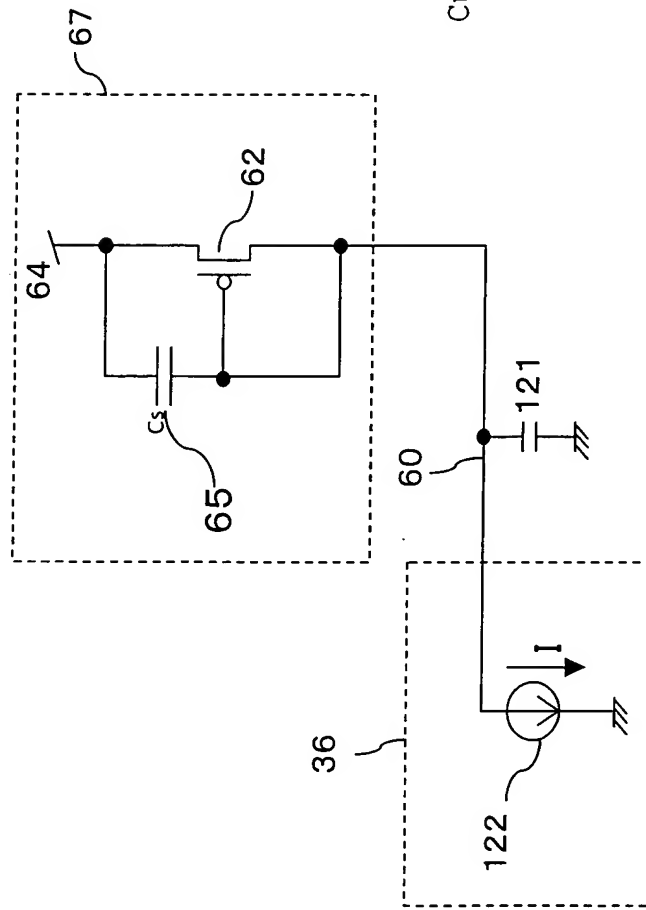


Fig. 12 (b)

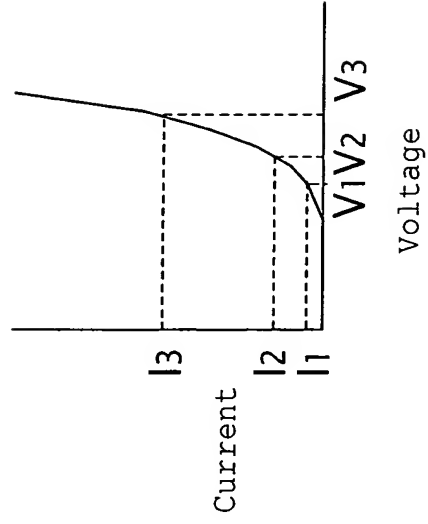
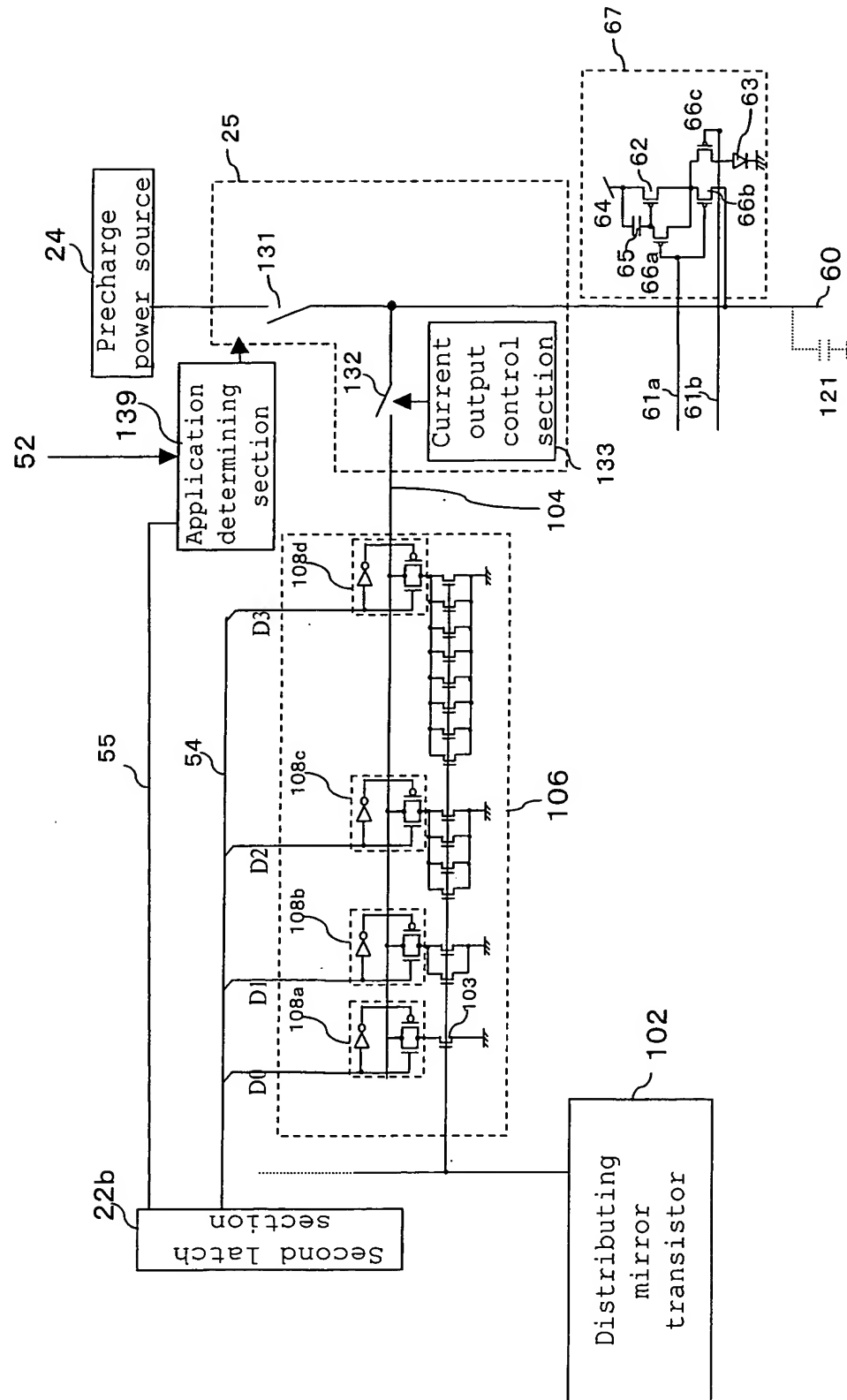


Fig. 13



14/190

Fig. 14(a)

Gray level	Transistor group	Characteristics of transistor group		
		Channel width [μm]	Channel length [μm]	Variation in output current [%]
1	241a	3.0	54	2.5
2	241b			1.8
4	242a	6.0	27	2.5
8	242b			1.8
16	242c			1.3
32	242d			0.9
64	242e			0.6
128	242f			0.5

Fig. 14(b)

Gray level	Transistor group	Characteristics of transistor group		
		Channel width [μm]	Channel length [μm]	Variation in output current [%]
1	241a	1.5	27	5.0
2	241b			3.5
4	242a	6.0	27	2.5
8	242b			1.8
16	242c			1.3
32	242d			0.9
64	242e			0.6
128	242f			0.5

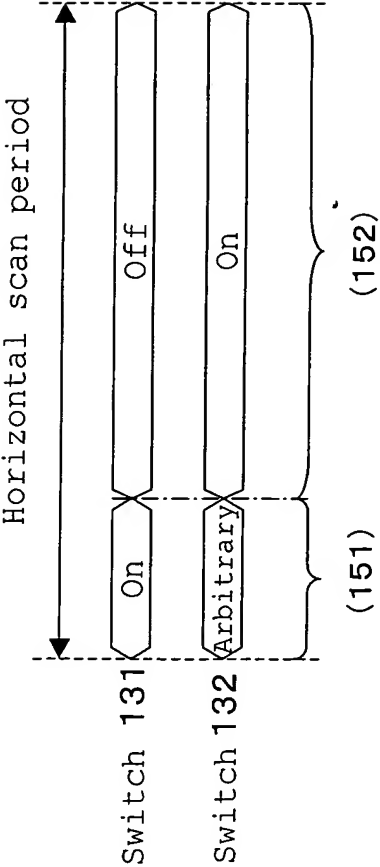


Fig. 15

16/190

Fig. 16

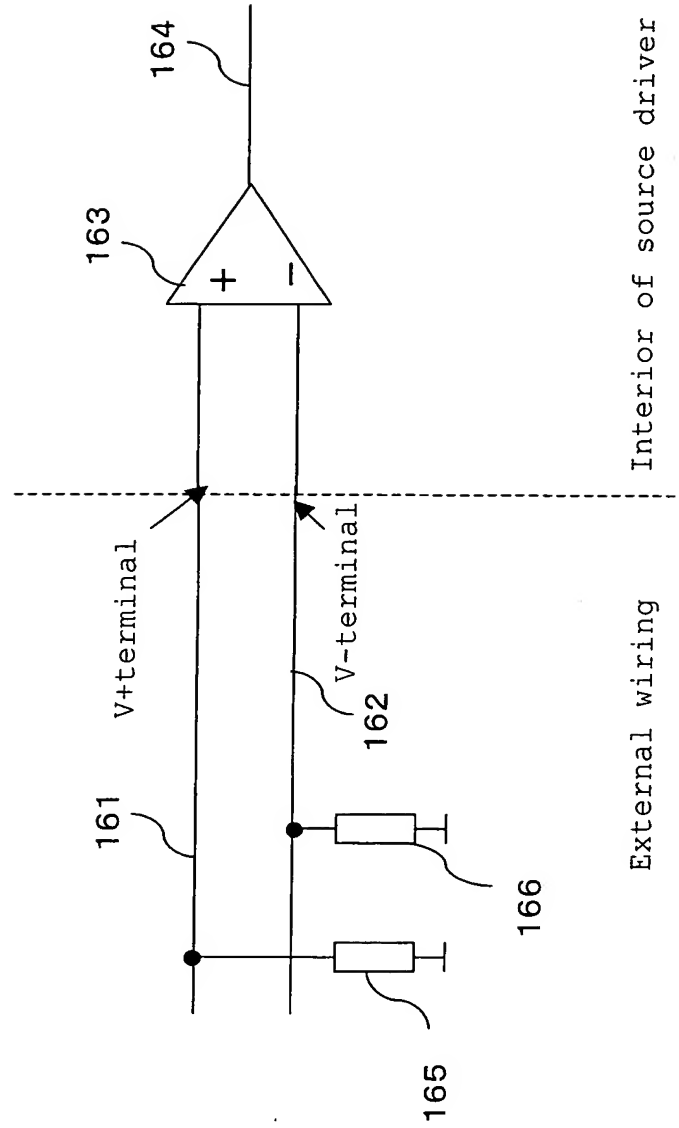


Fig. 17 (a)

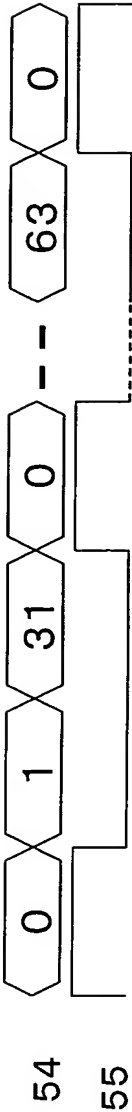


Fig. 17 (b)

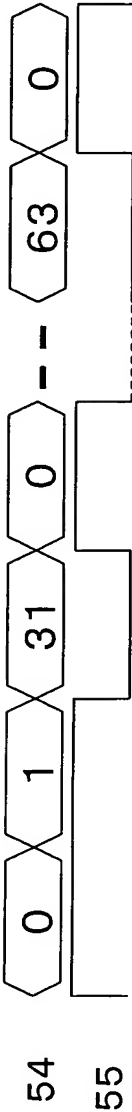


Fig. 17 (c)

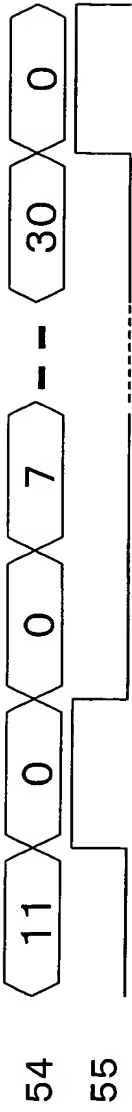
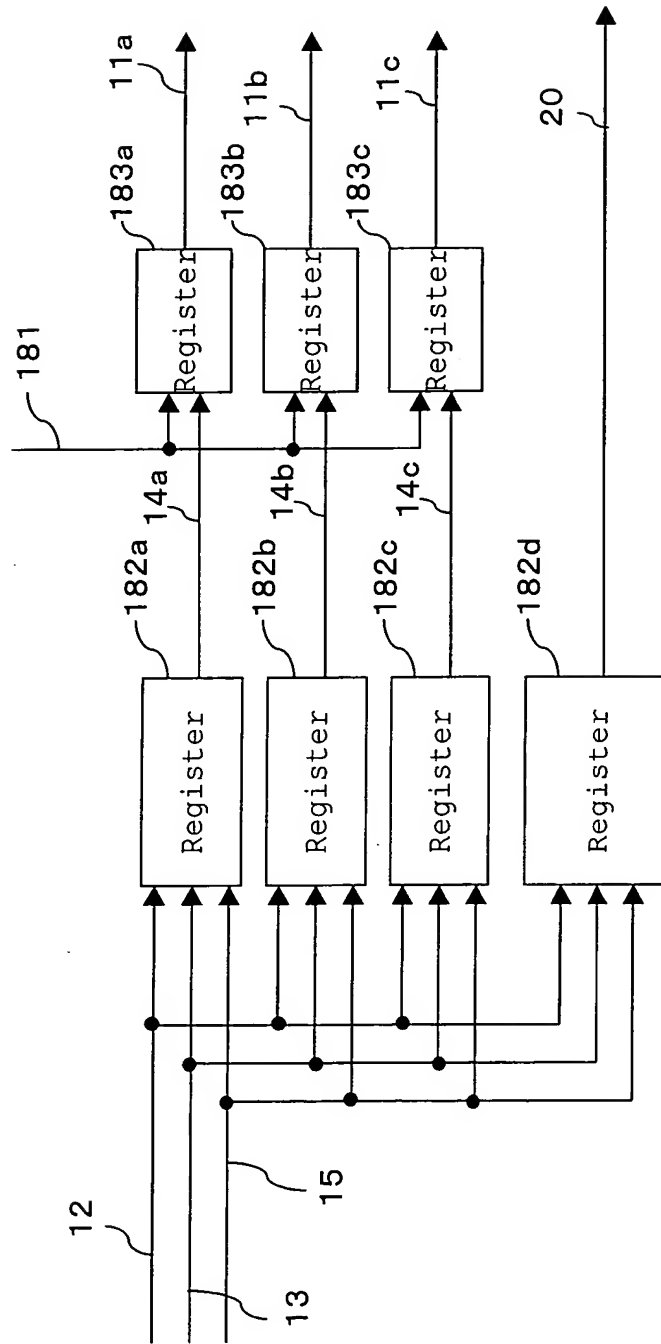
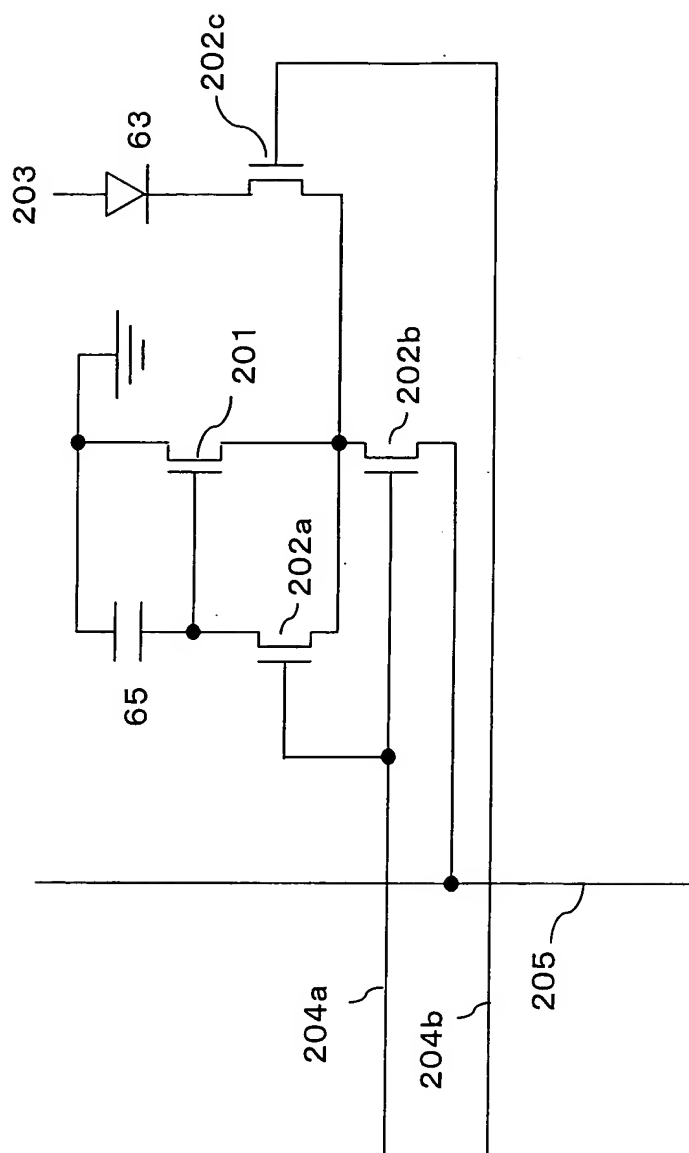


Fig. 18

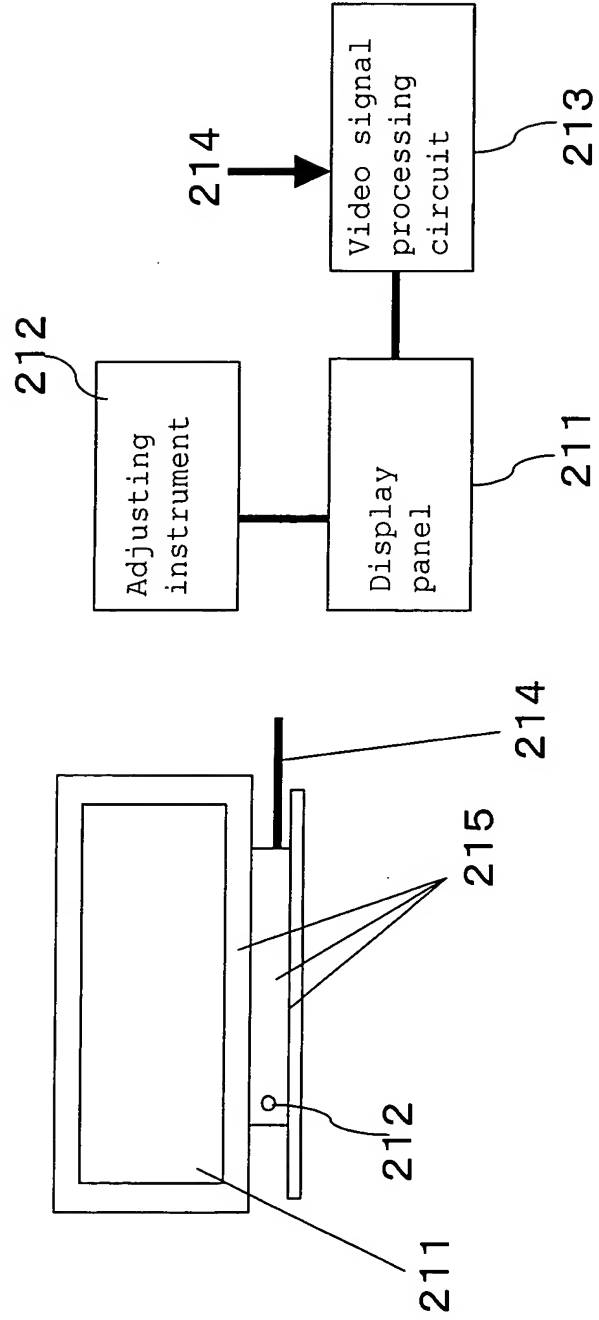






21/190

Fig. 21



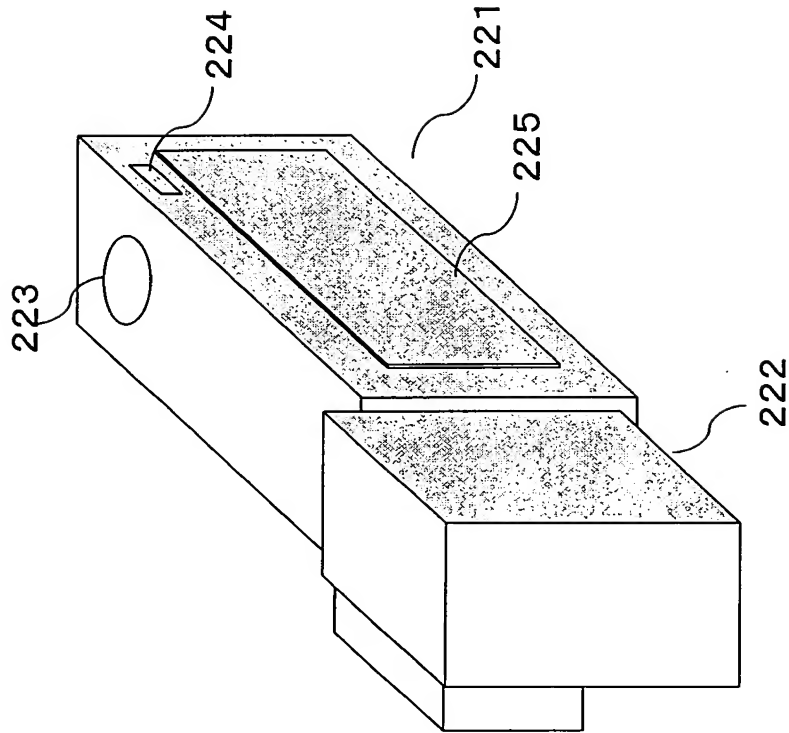


Fig. 22

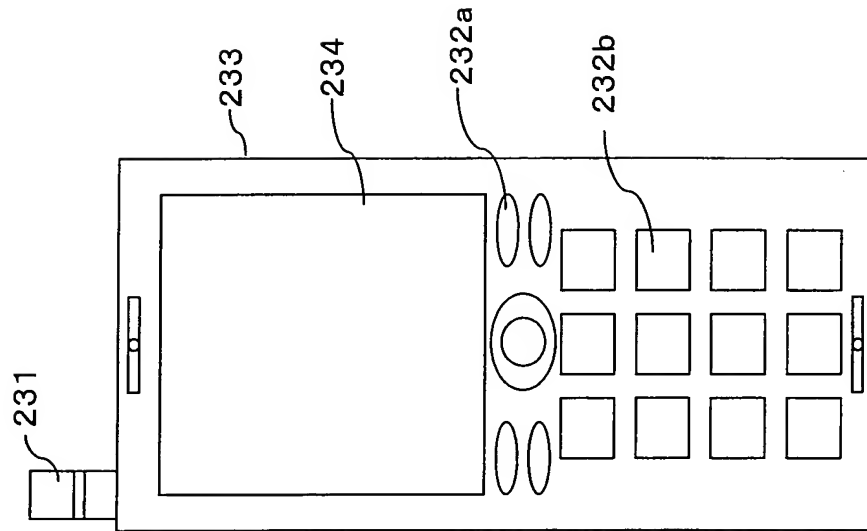
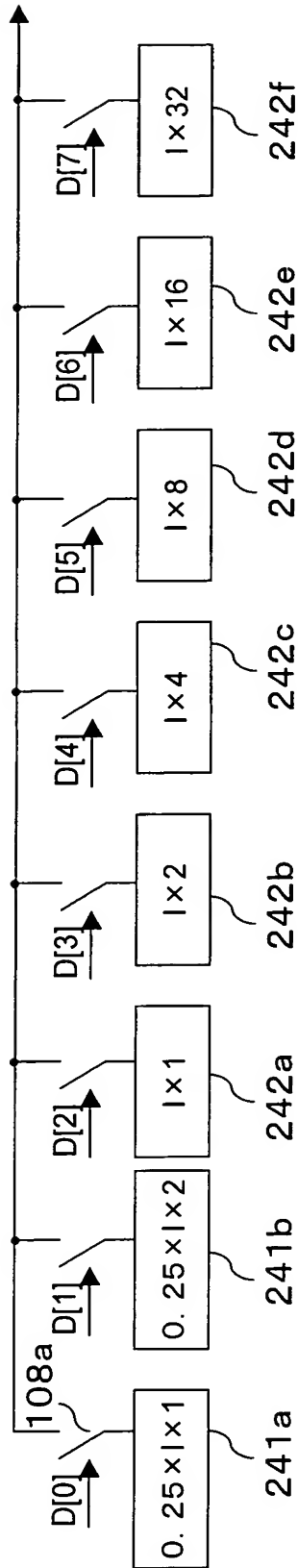


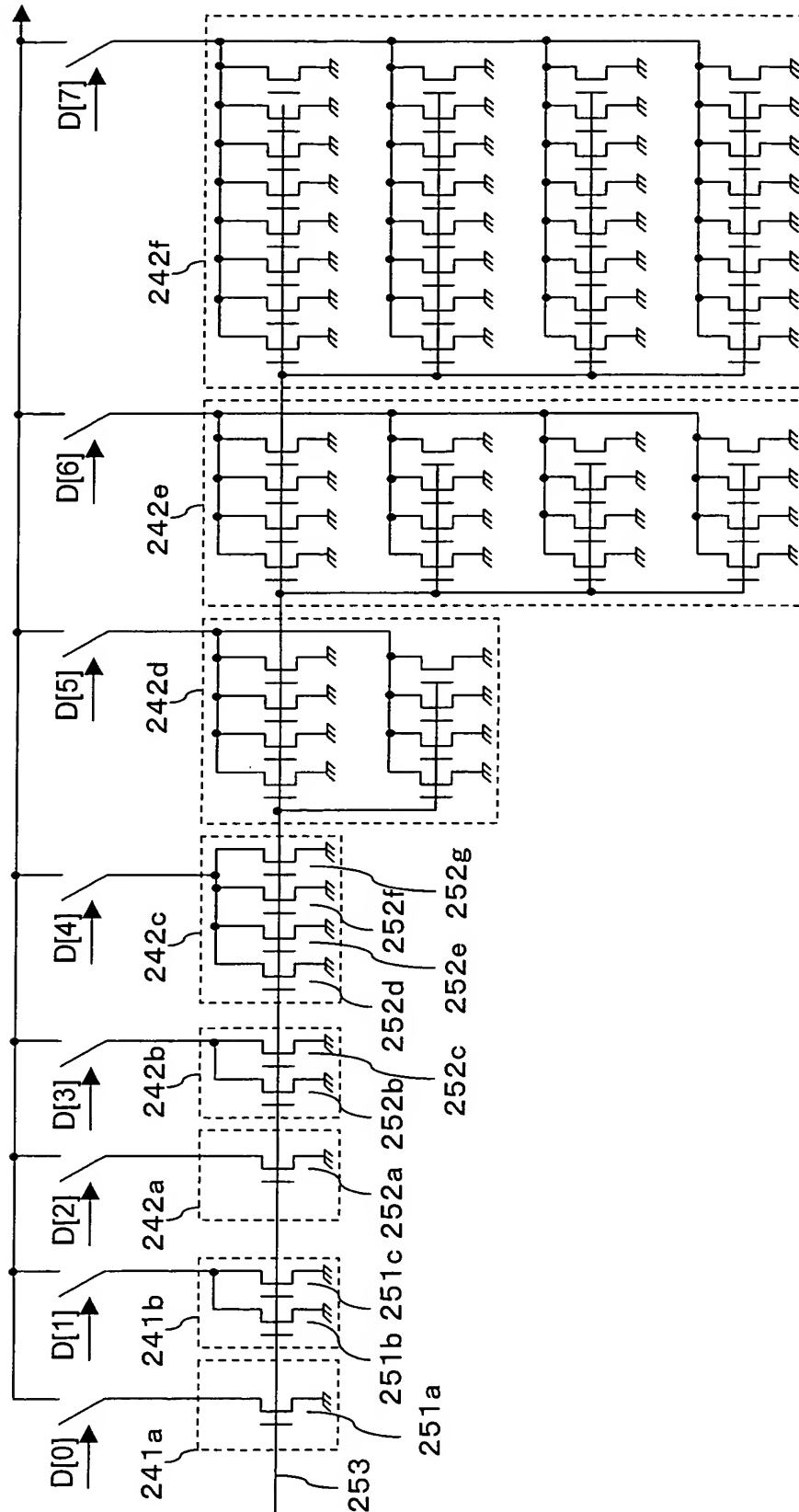
Fig. 23

Fig. 24

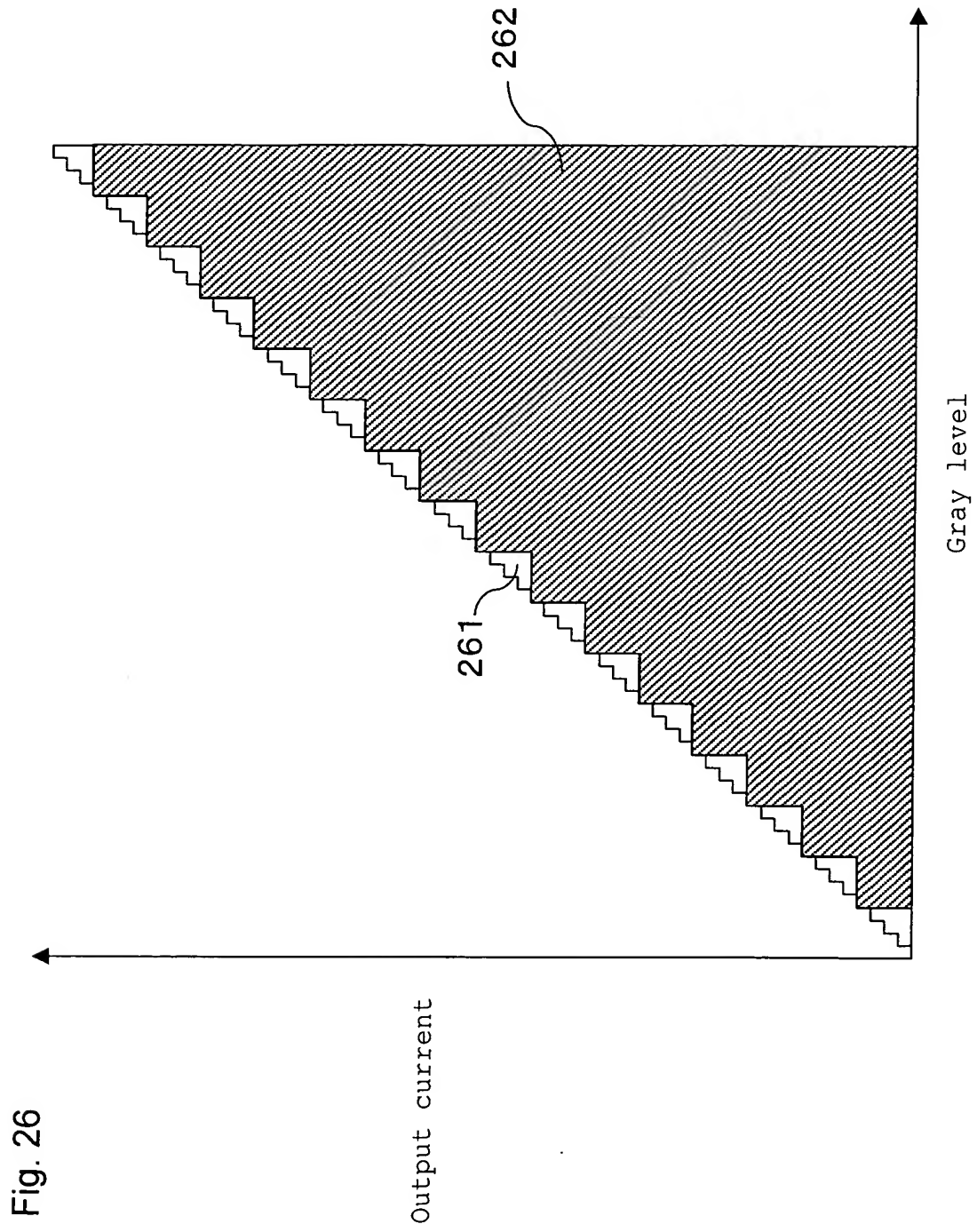


25/190

Fig. 25



26/190



27/190

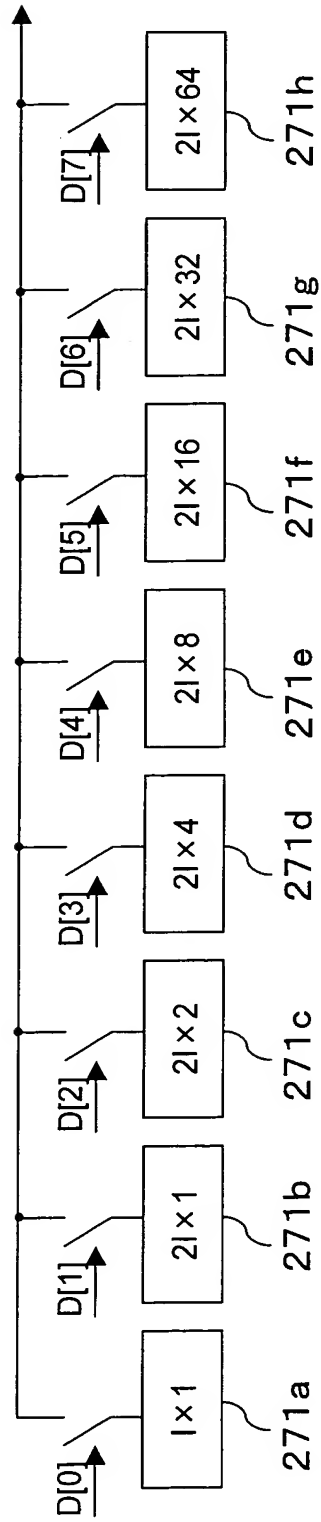
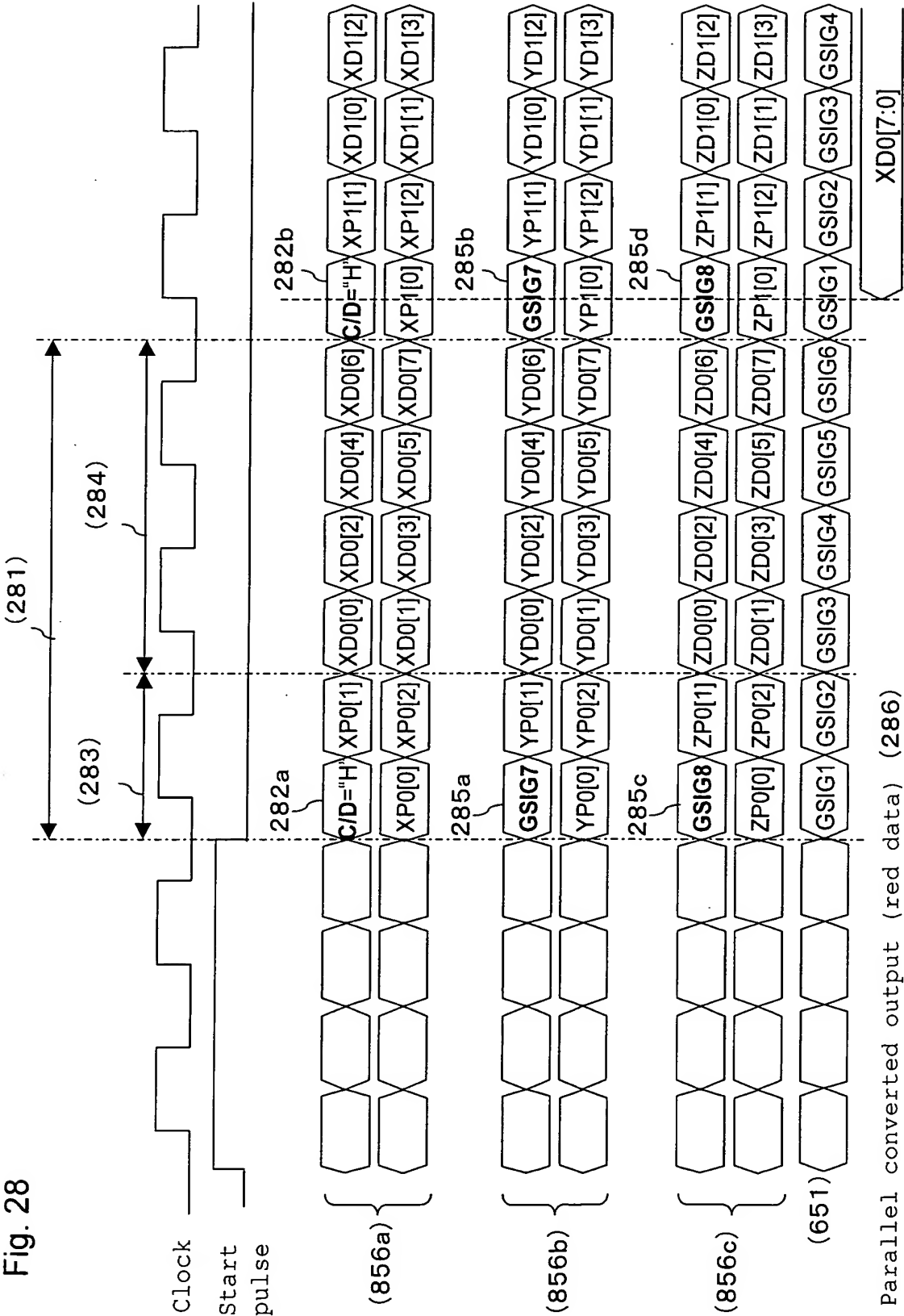


Fig. 27



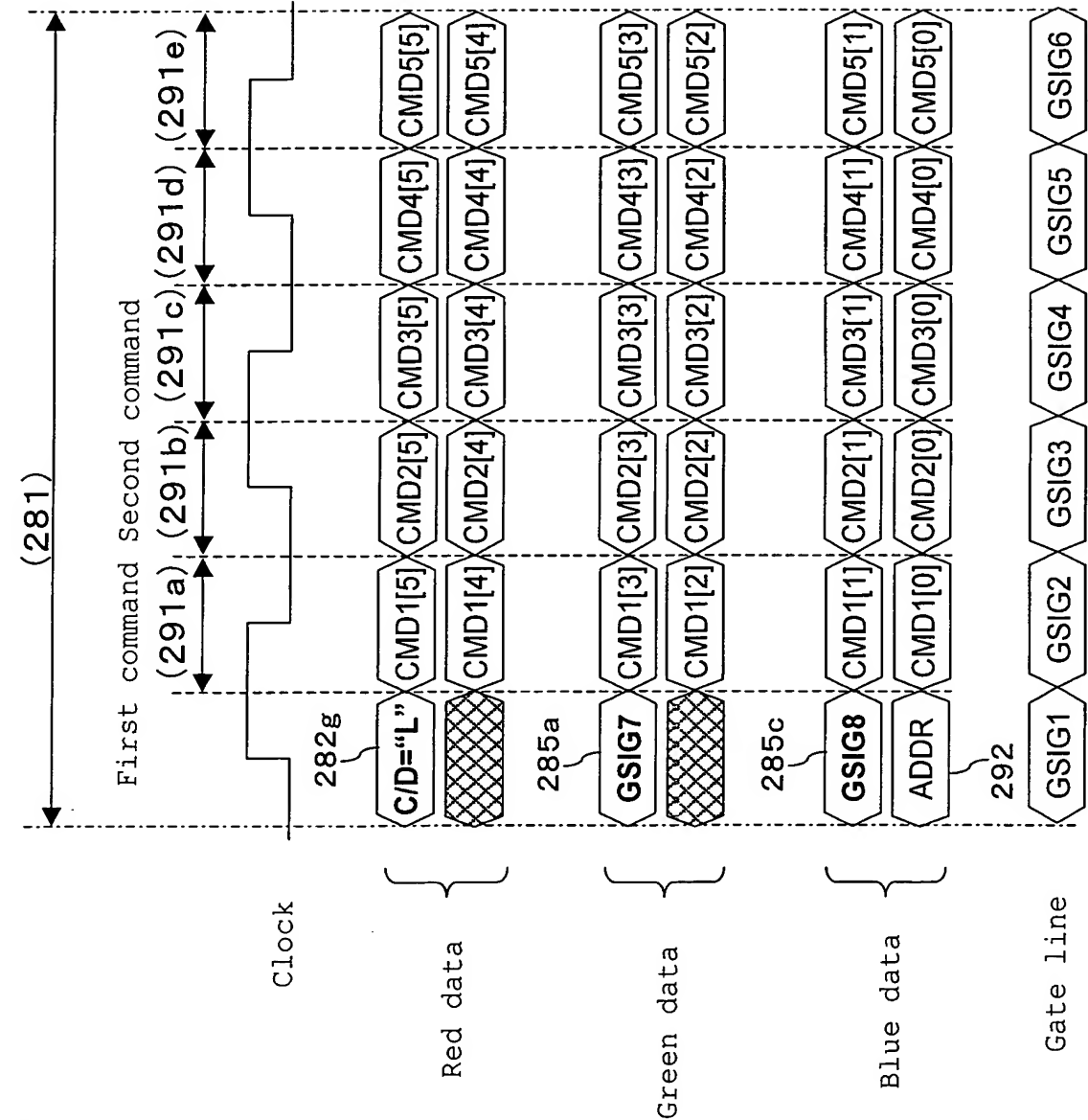


Fig. 30

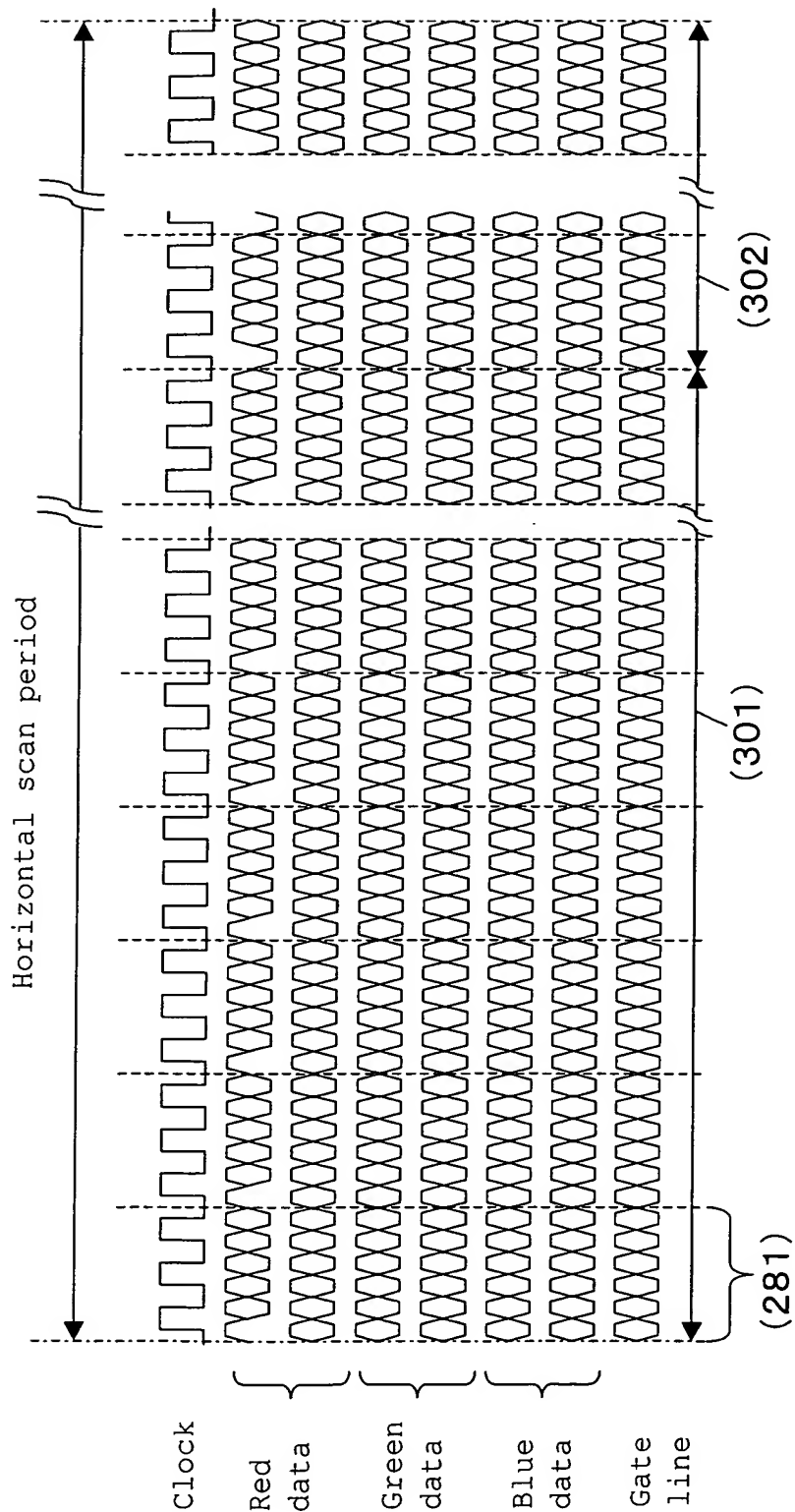


Fig. 31

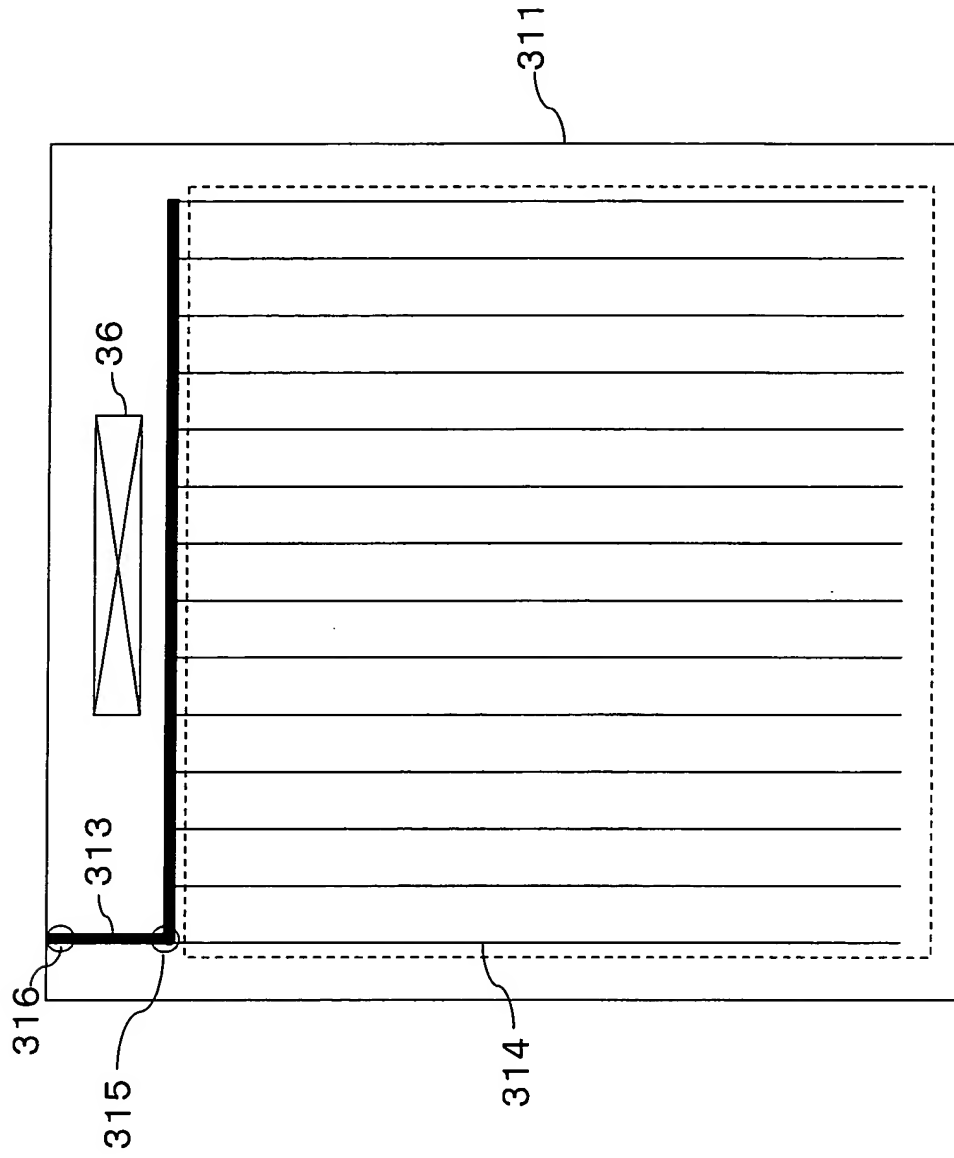
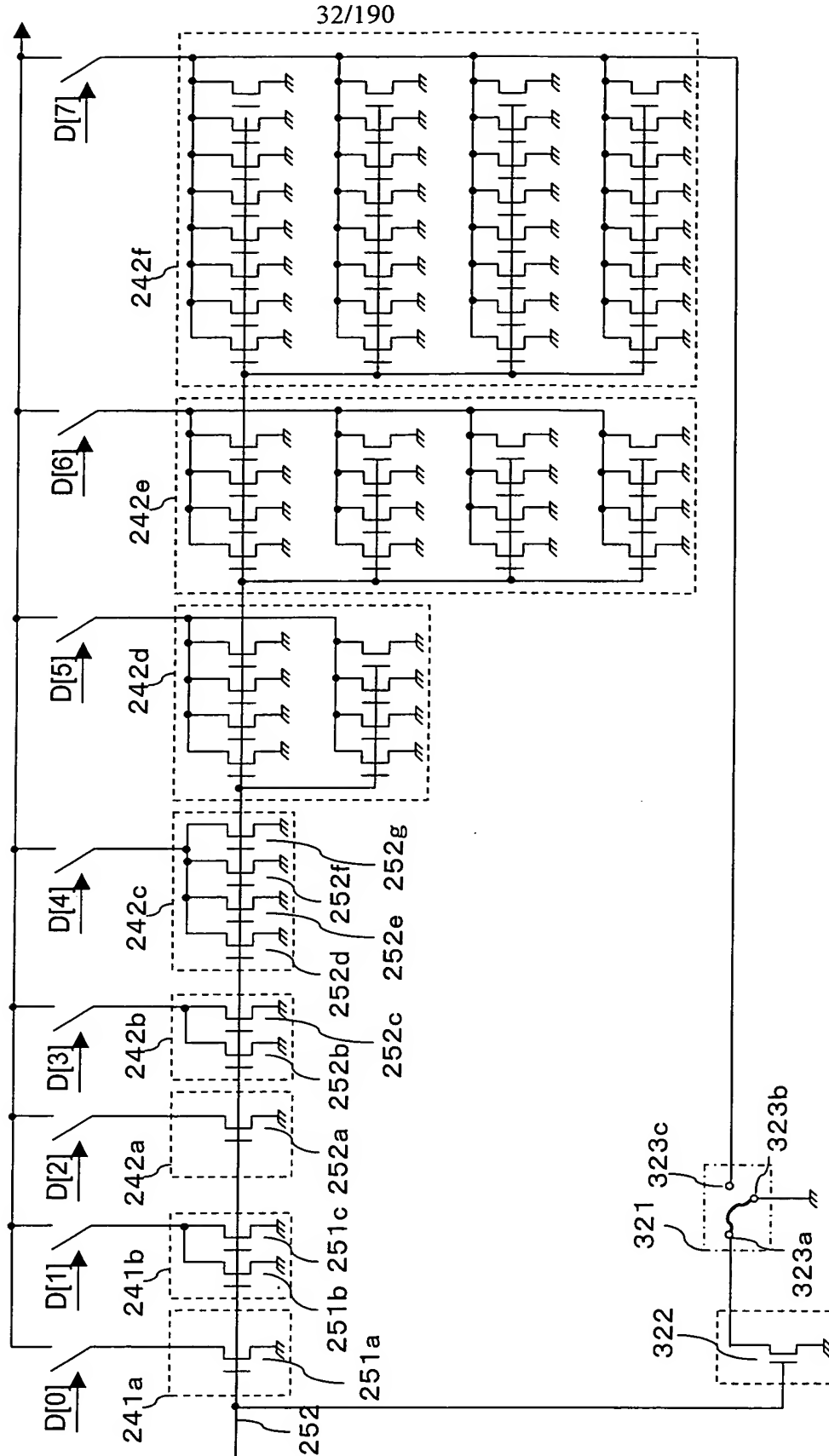
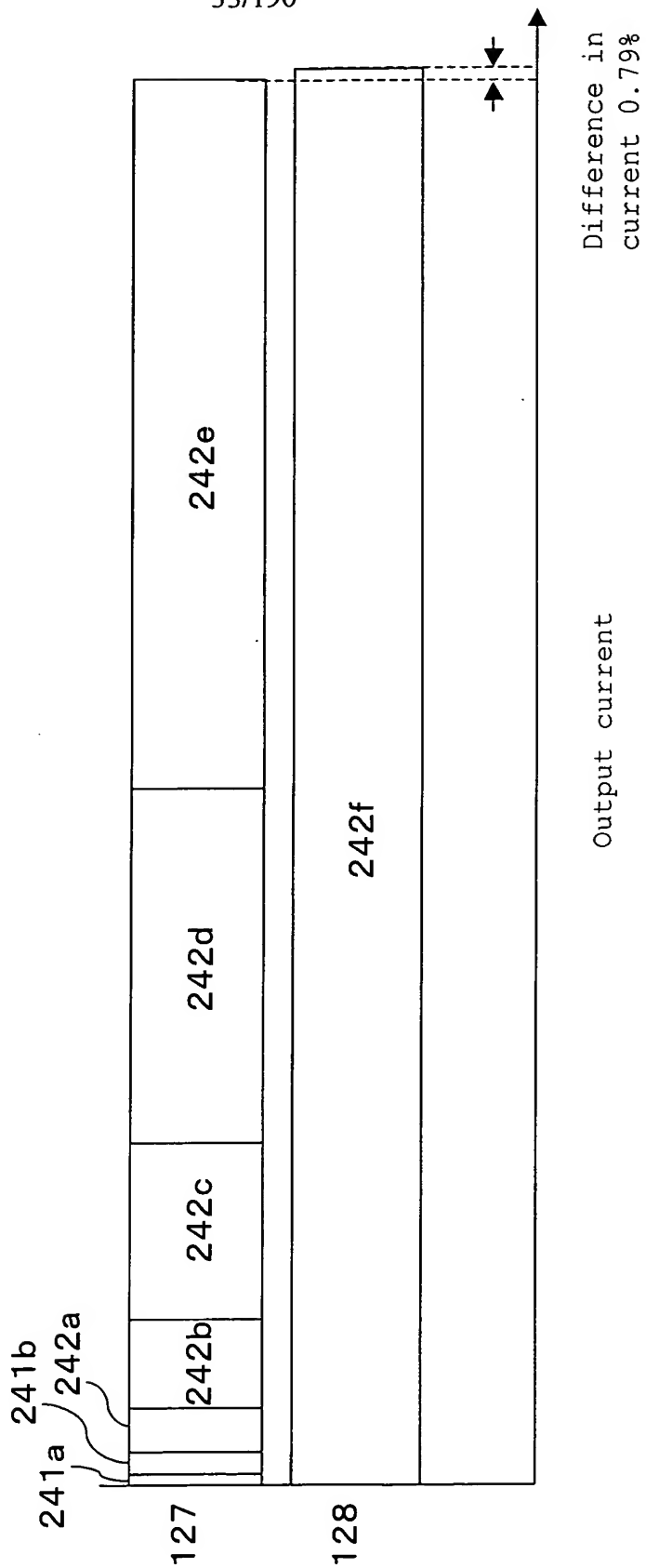


Fig. 32



33/190

Fig. 33



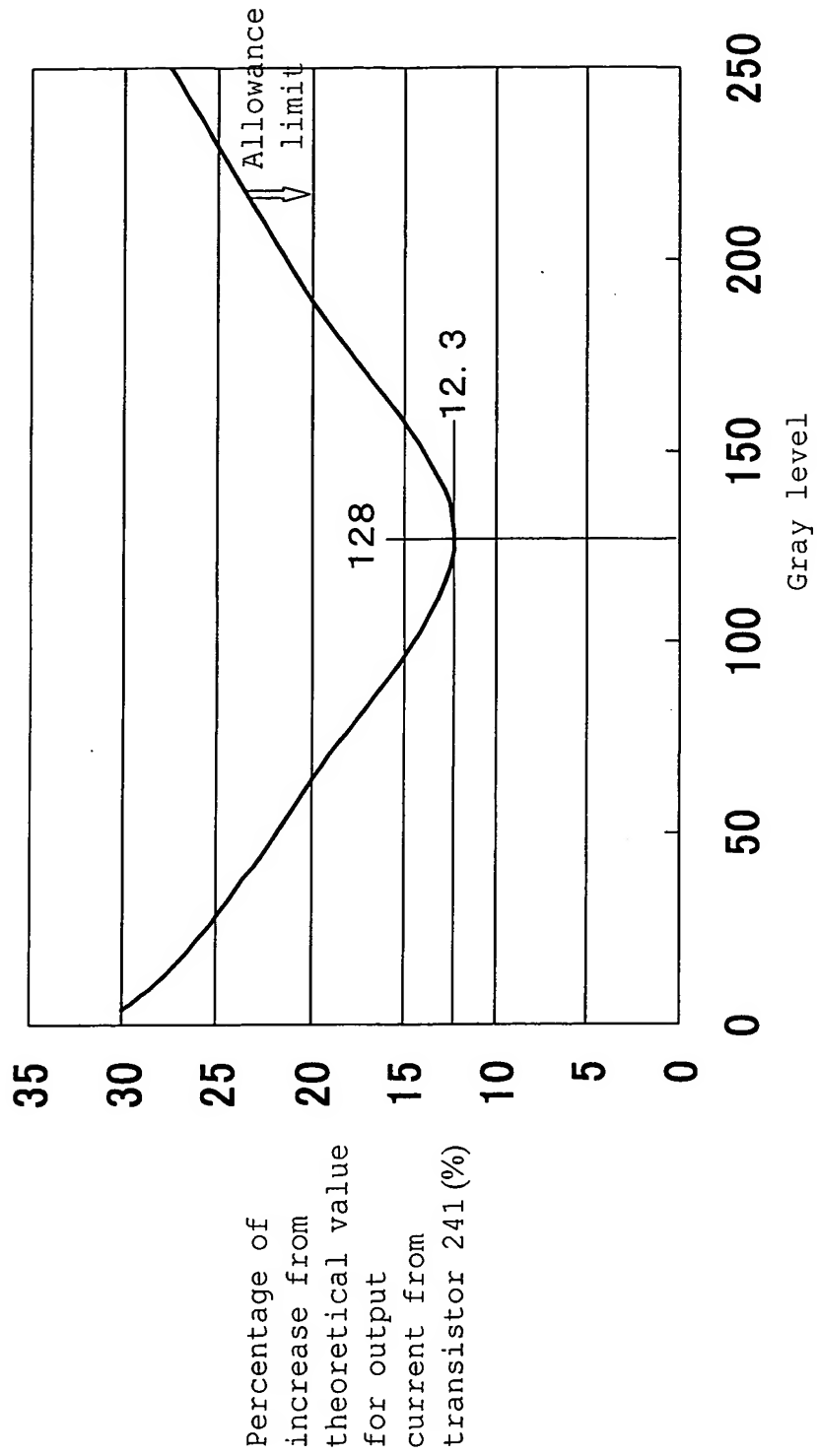


Fig. 34

Fig. 35

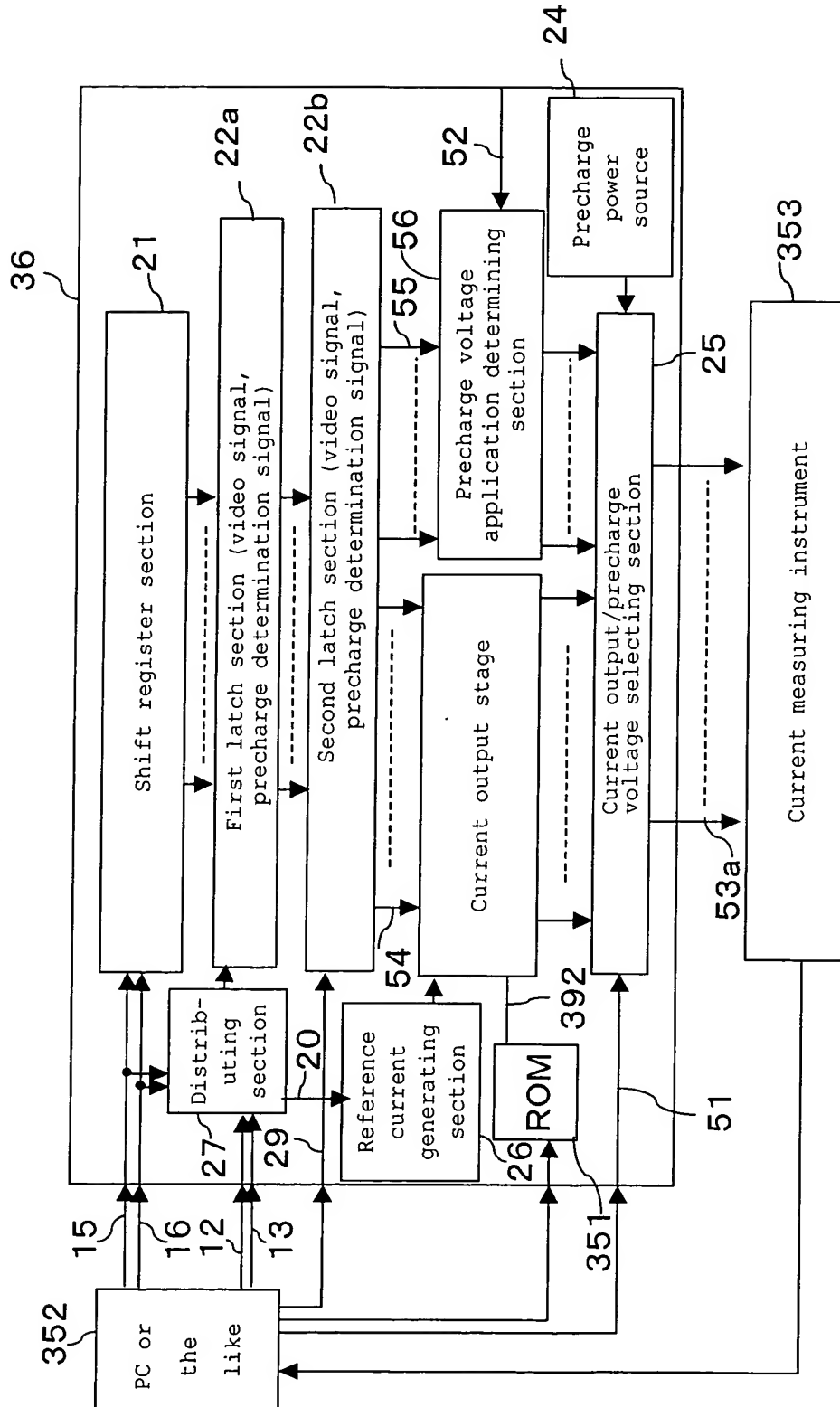
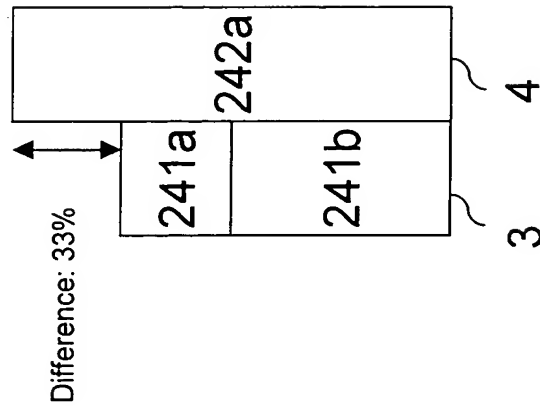


Fig. 36



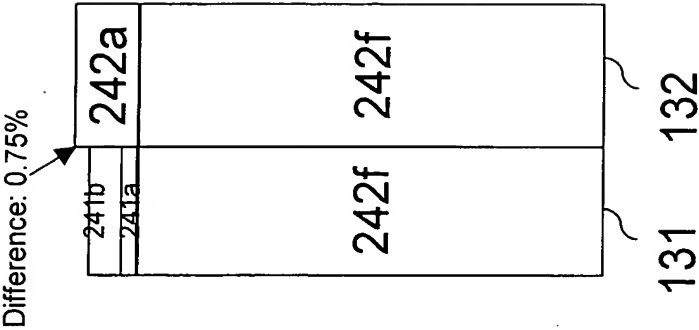


Fig. 37

38/190

Fig. 38

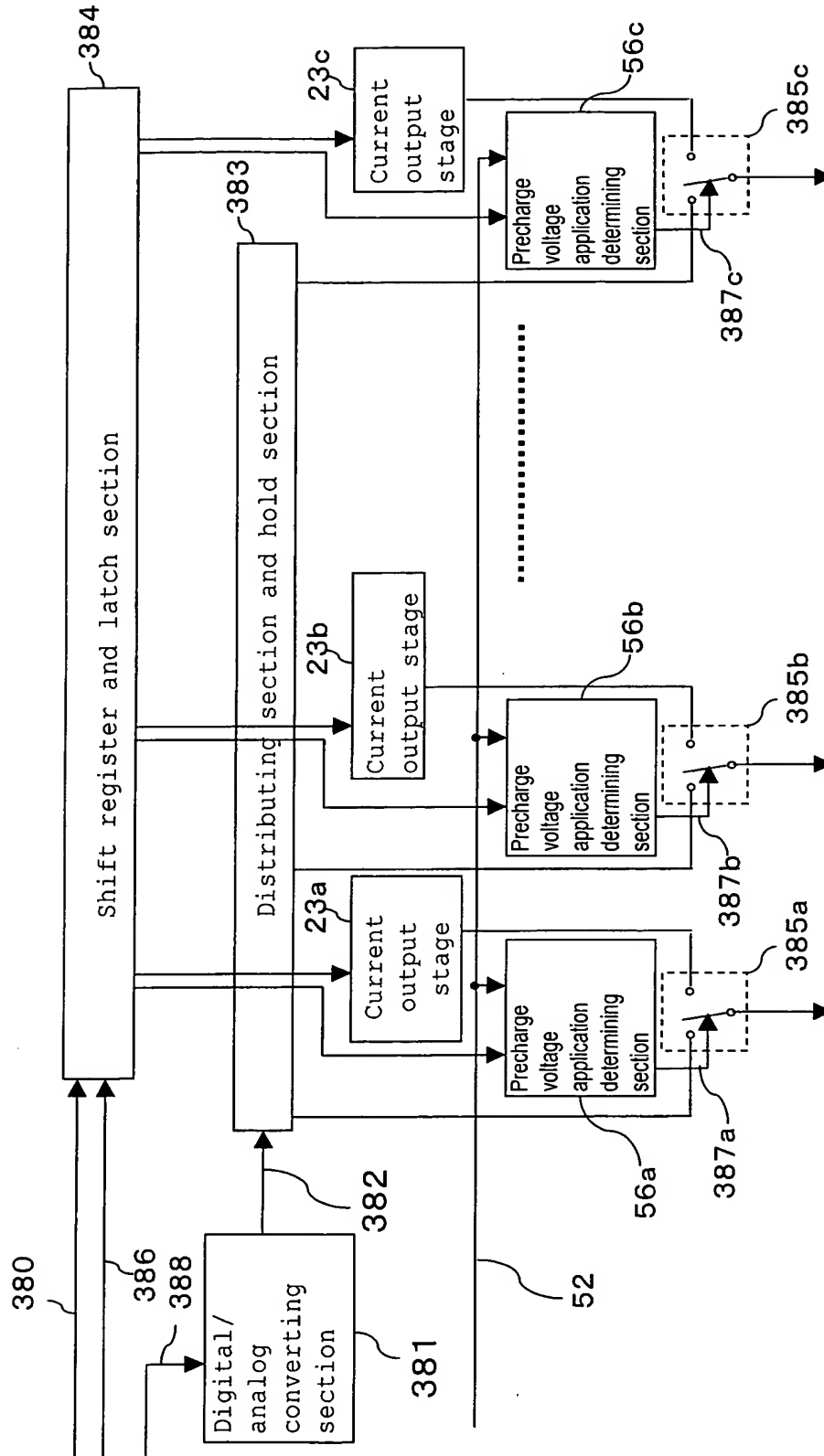
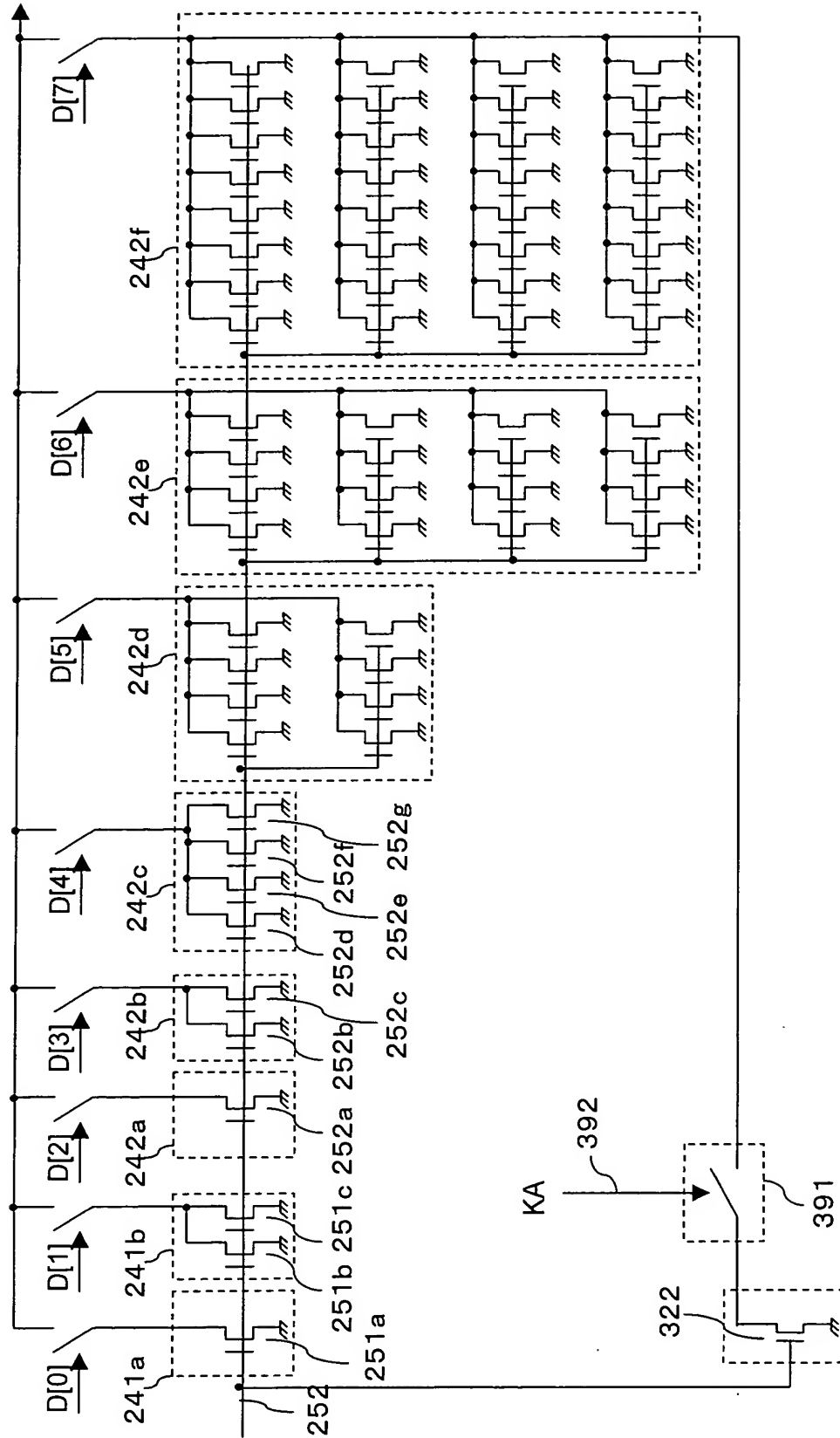
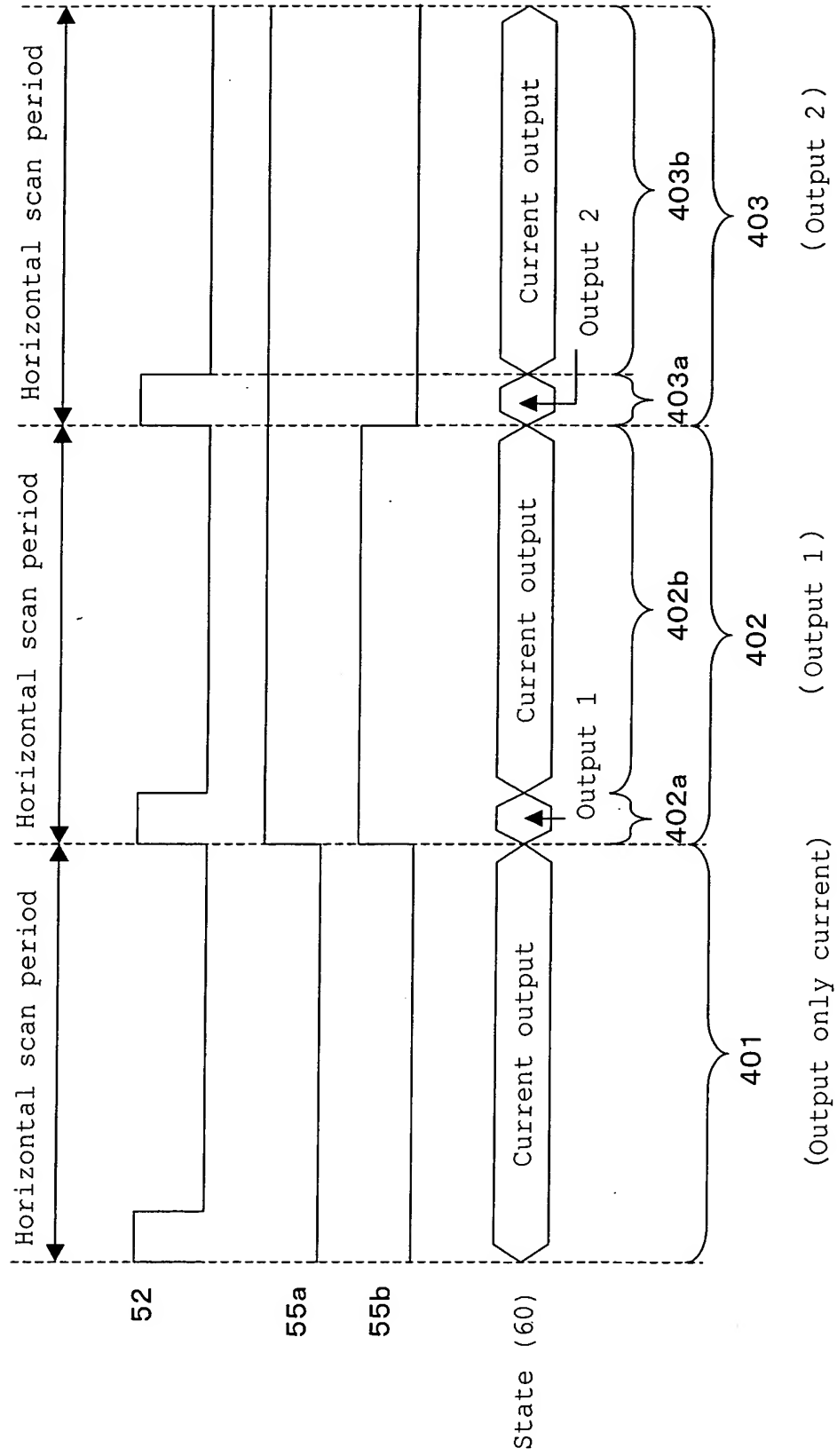


Fig. 39



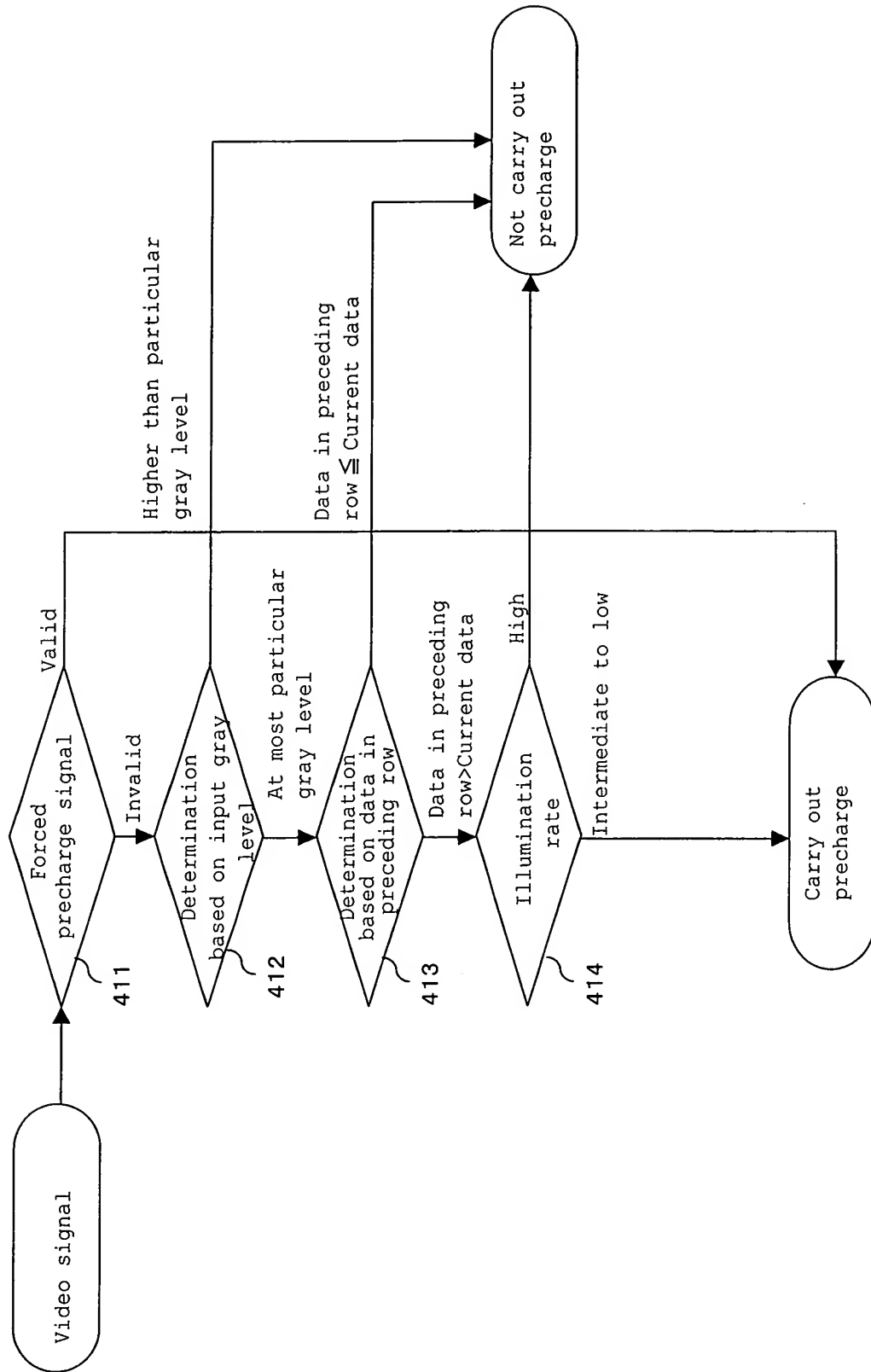
40/190

Fig. 40



41/190

Fig. 41



42/190

Fig. 42

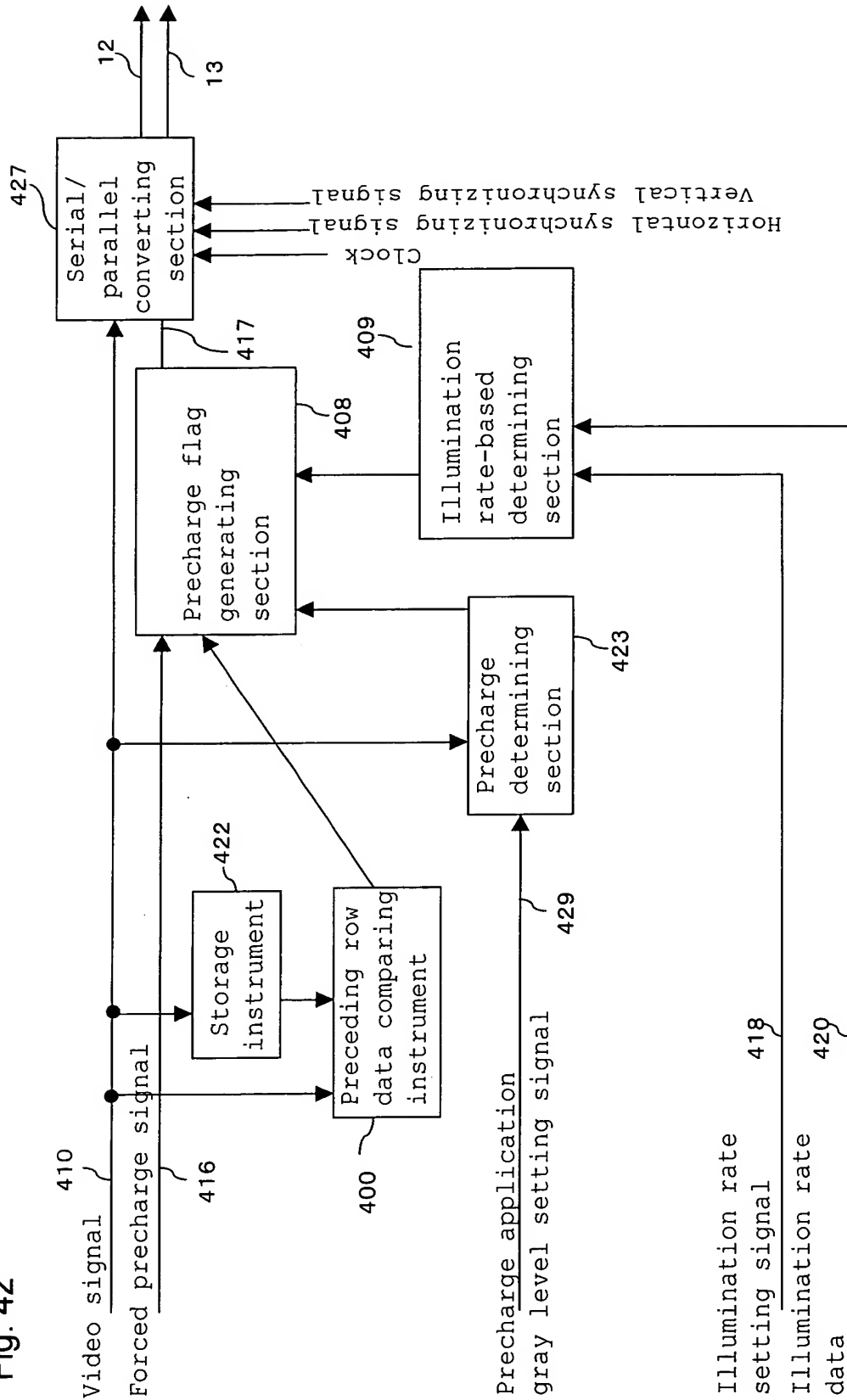


Fig. 44

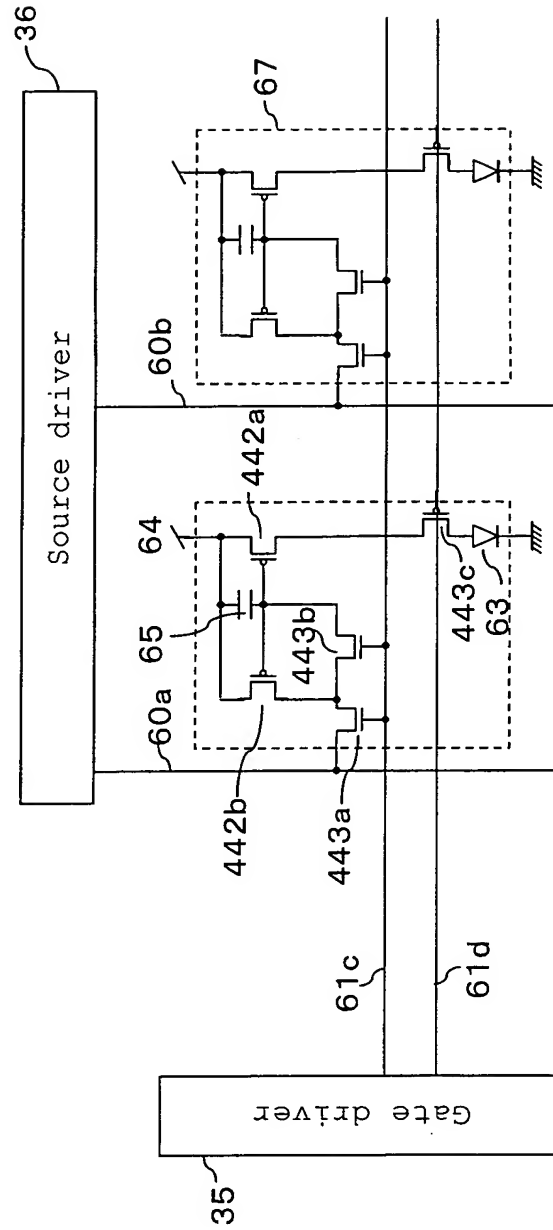
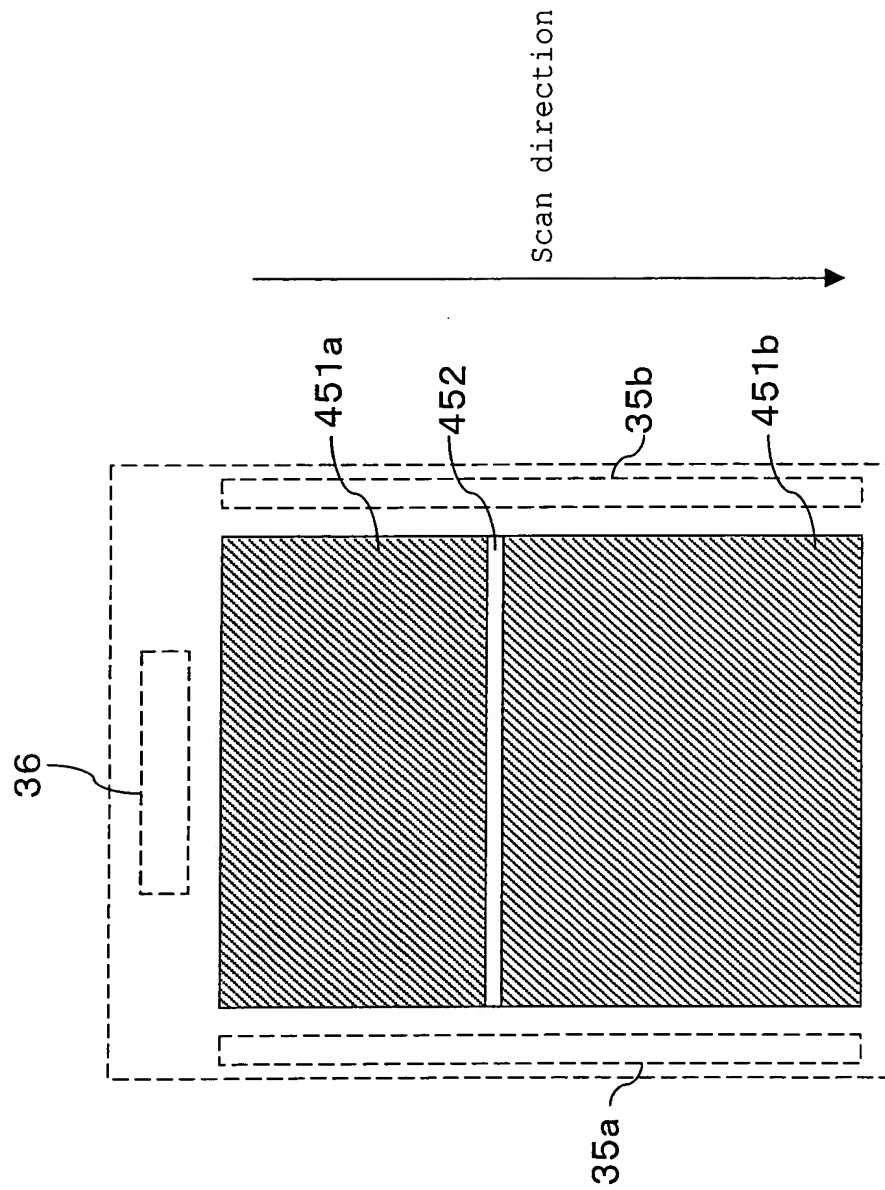


Fig. 45



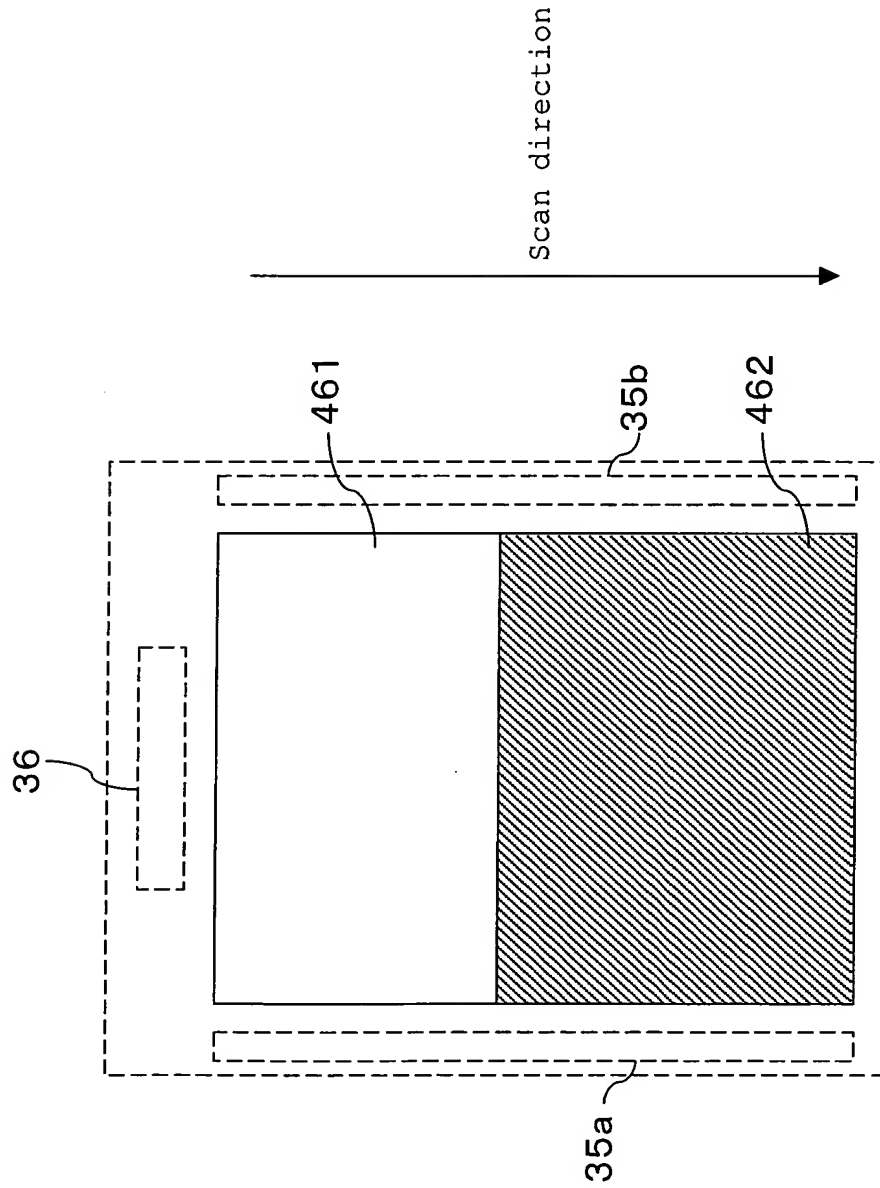


Fig. 46

Fig. 47

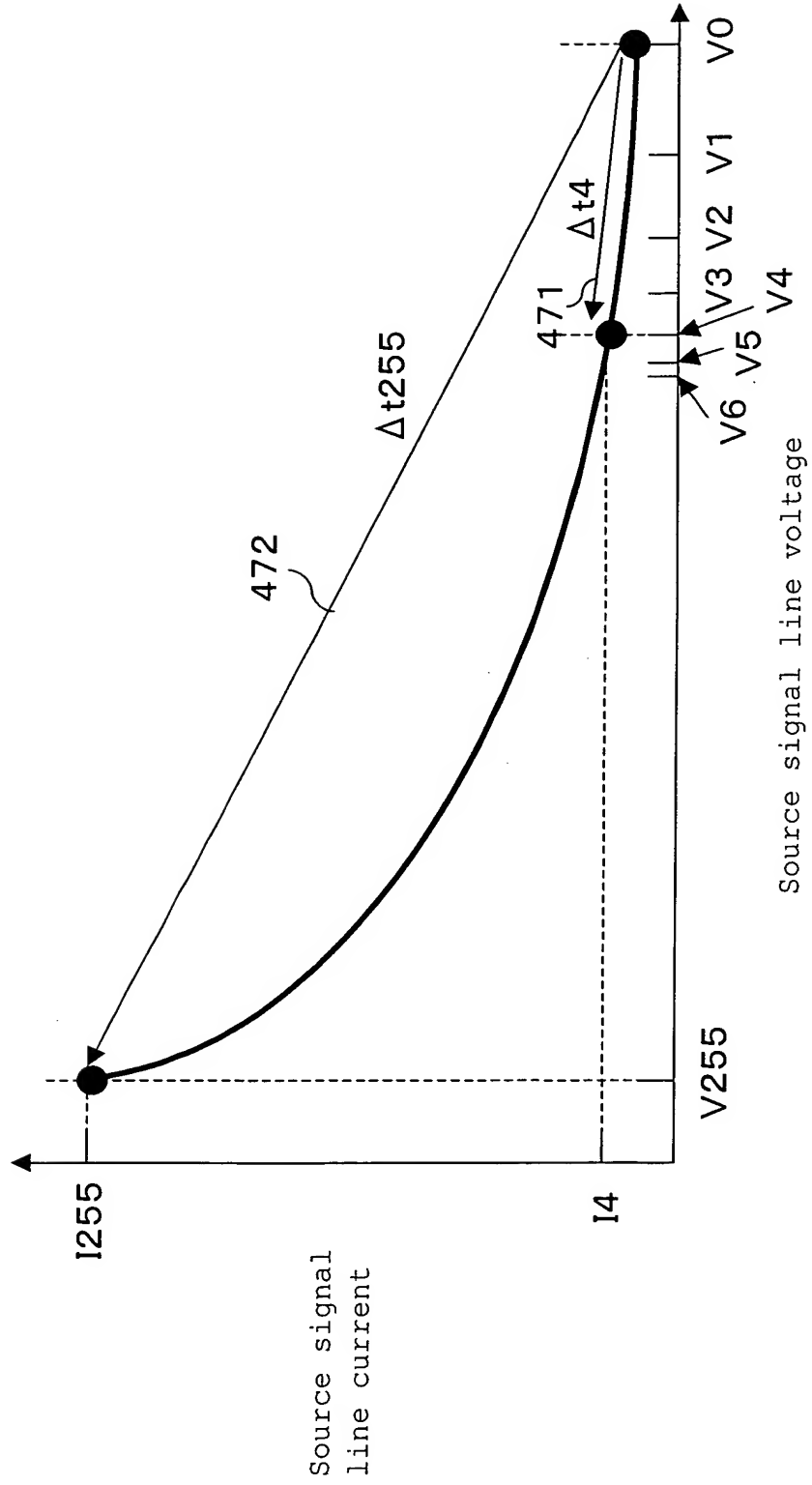


Fig. 48

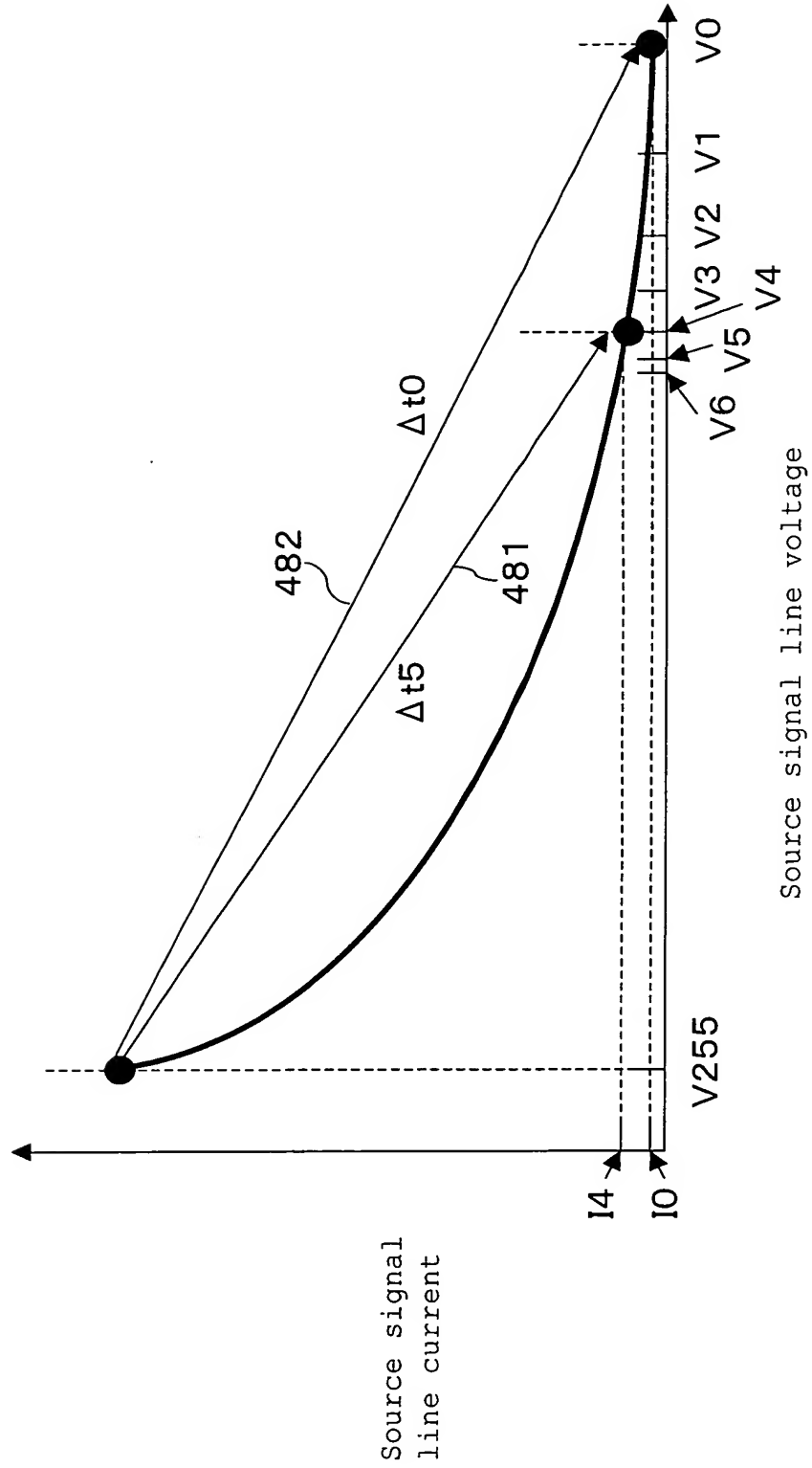
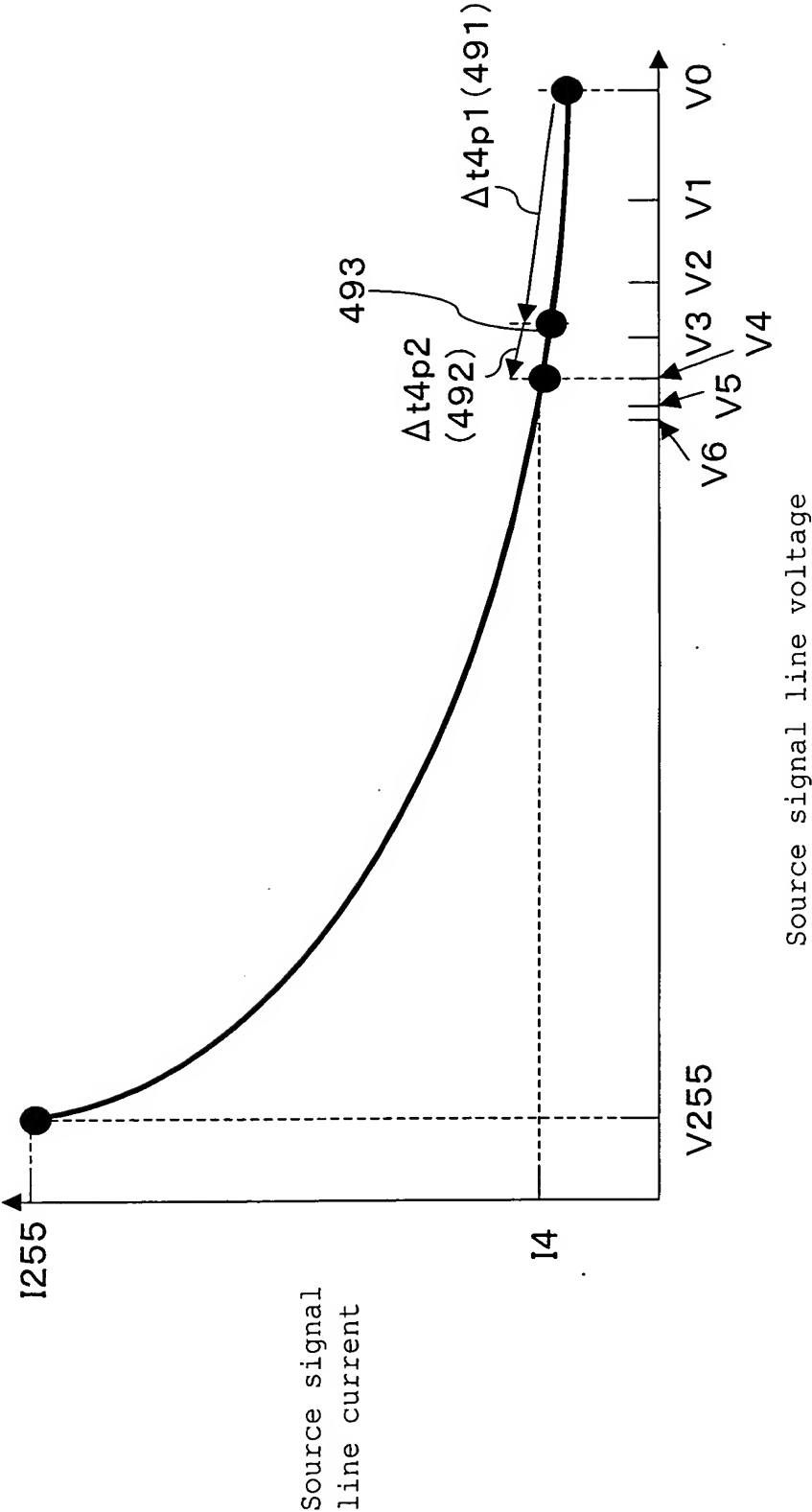


Fig. 49



50/190

Fig. 50

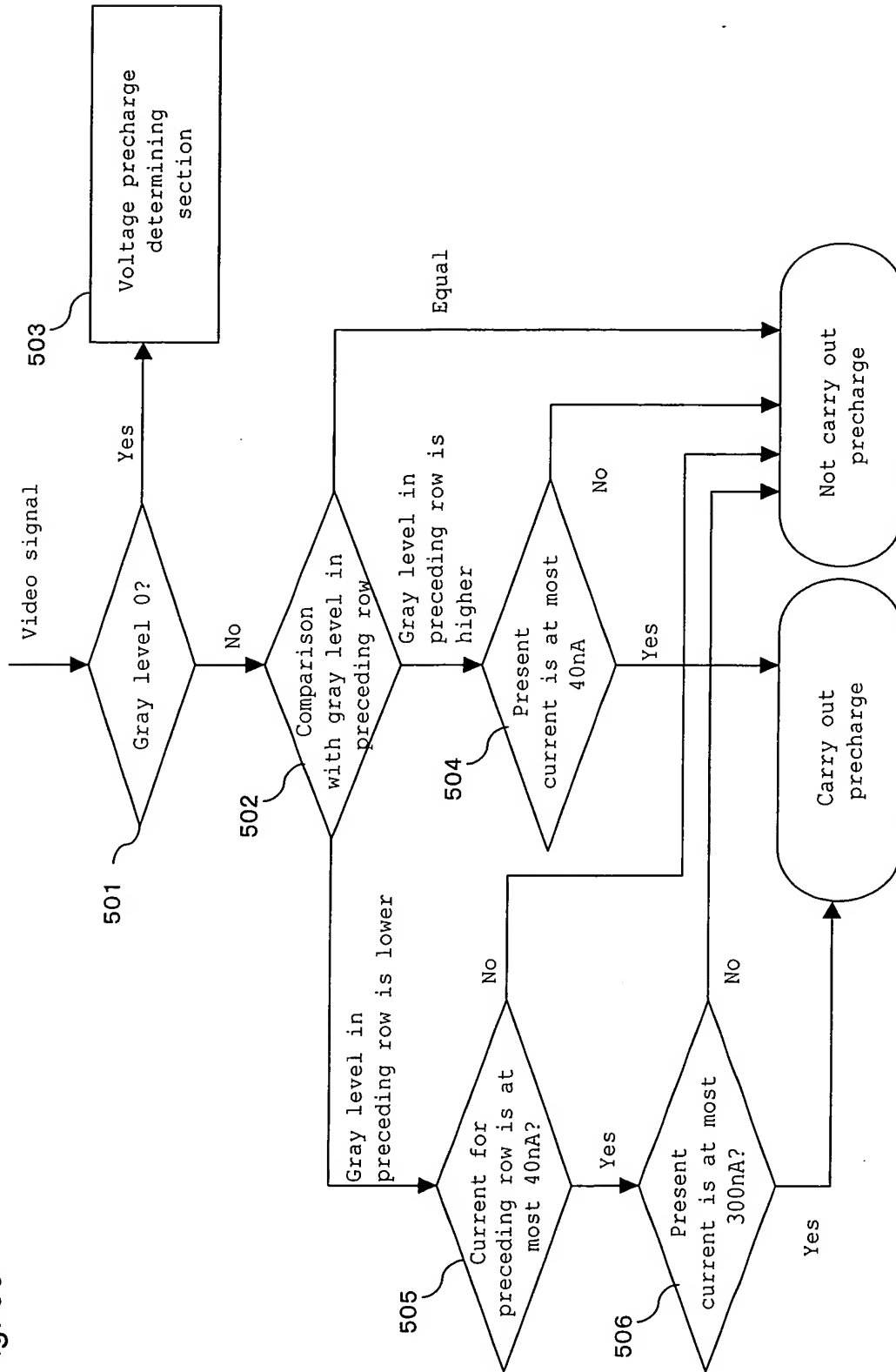
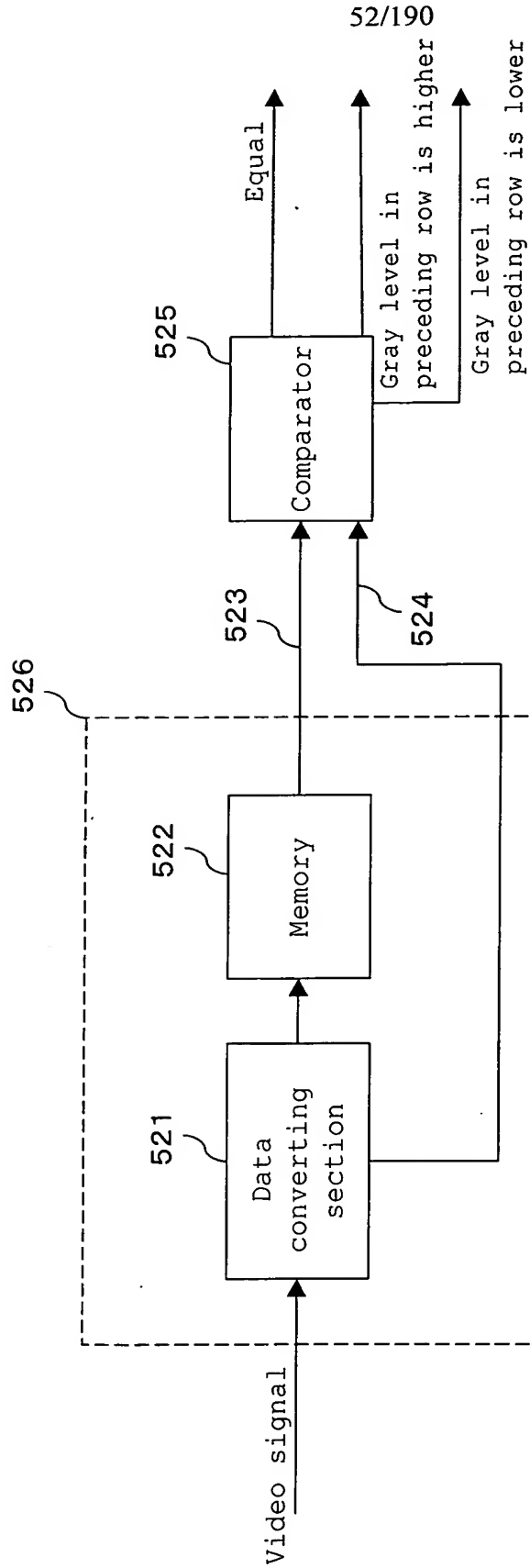


Fig. 51

Gray level of video signal	Data written to memory
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
Equal to or more than 16	15

Fig. 52



53/190

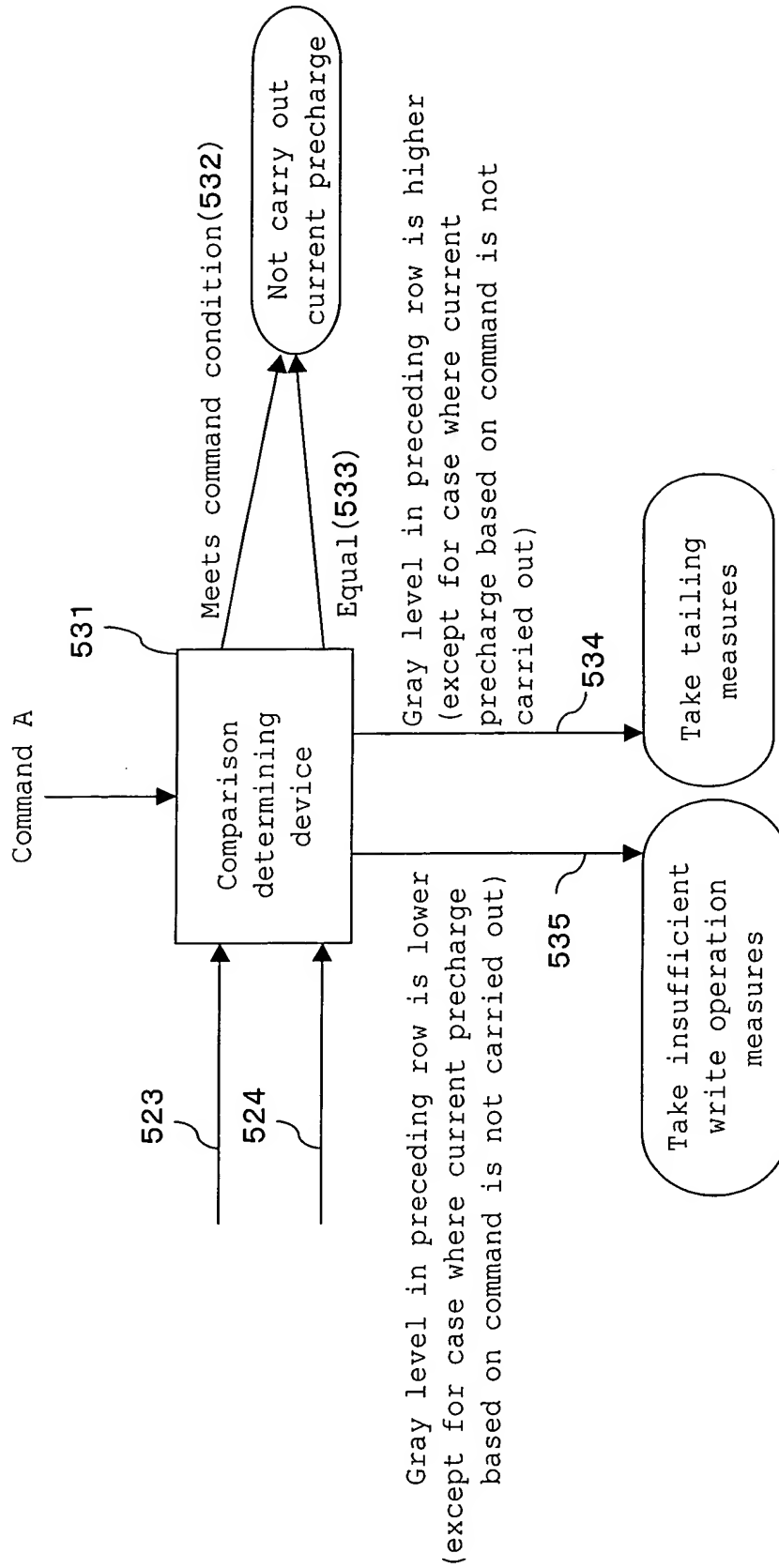


Fig. 53

54/190

Fig. 54

Value for command A	Operation
0	Not carry out current precharge (for all combinations)
1	Not carry out current precharge if difference in gray level from data in preceding row is 1
2	Not carry out current precharge if difference in gray level from data in preceding row is 1 but carry out current precharge if change is from gray level 0 to gray level 1
3	Not carry out current precharge if difference in gray level from data in preceding row is at most 2
4	Not carry out current precharge if difference in gray level from data in preceding row is at most 2 but carry out current precharge if change is from gray level 0 to gray level 2

55/190

Fig. 55

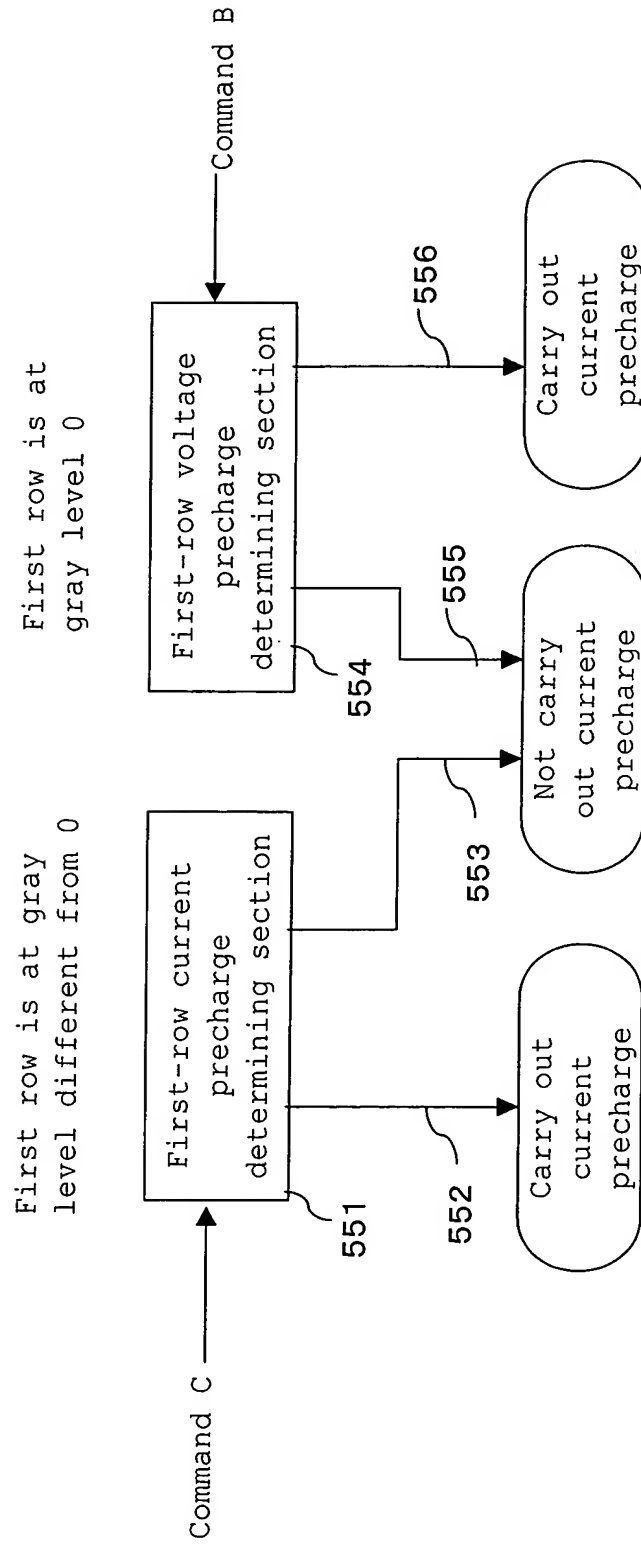


Fig. 56

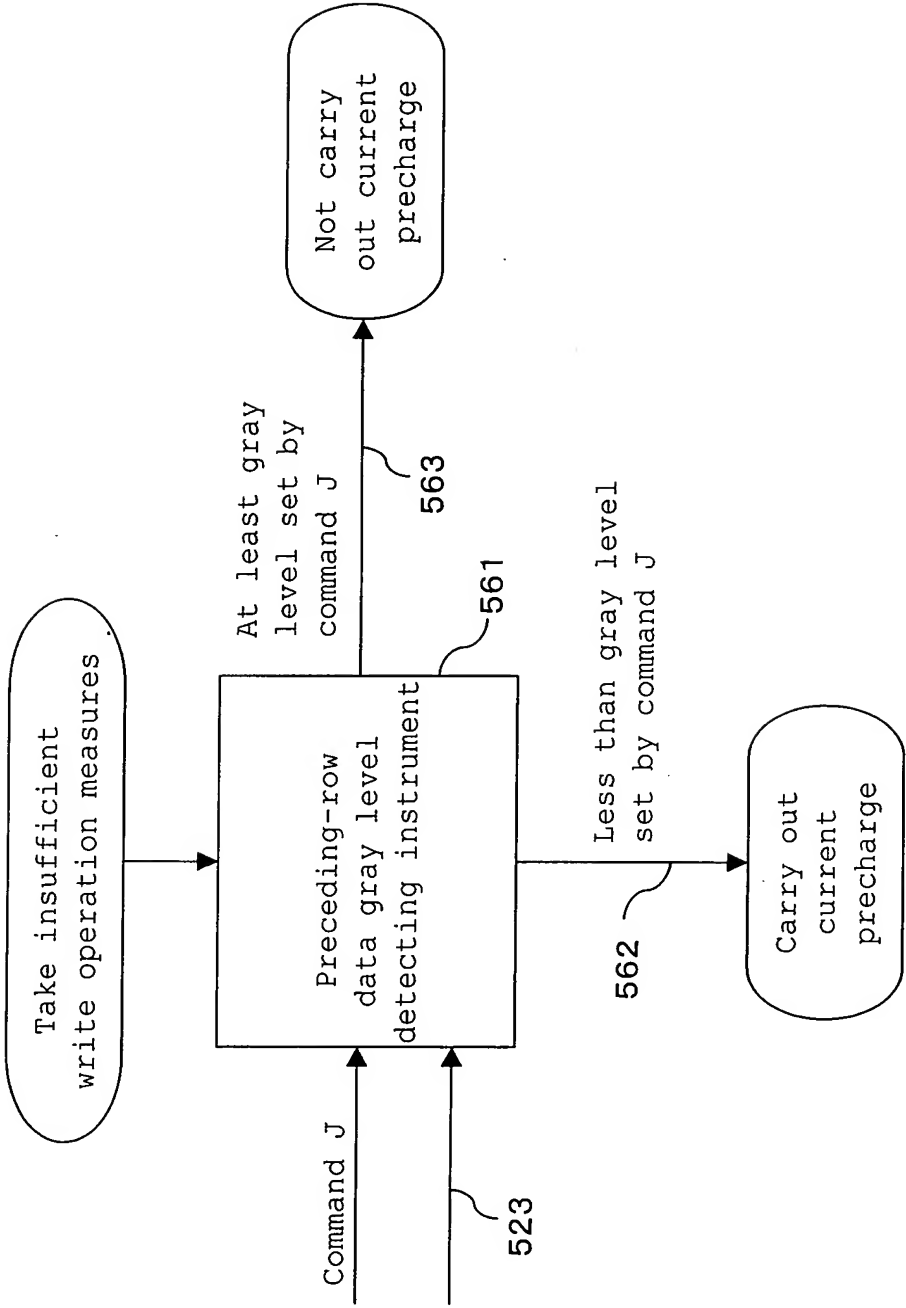
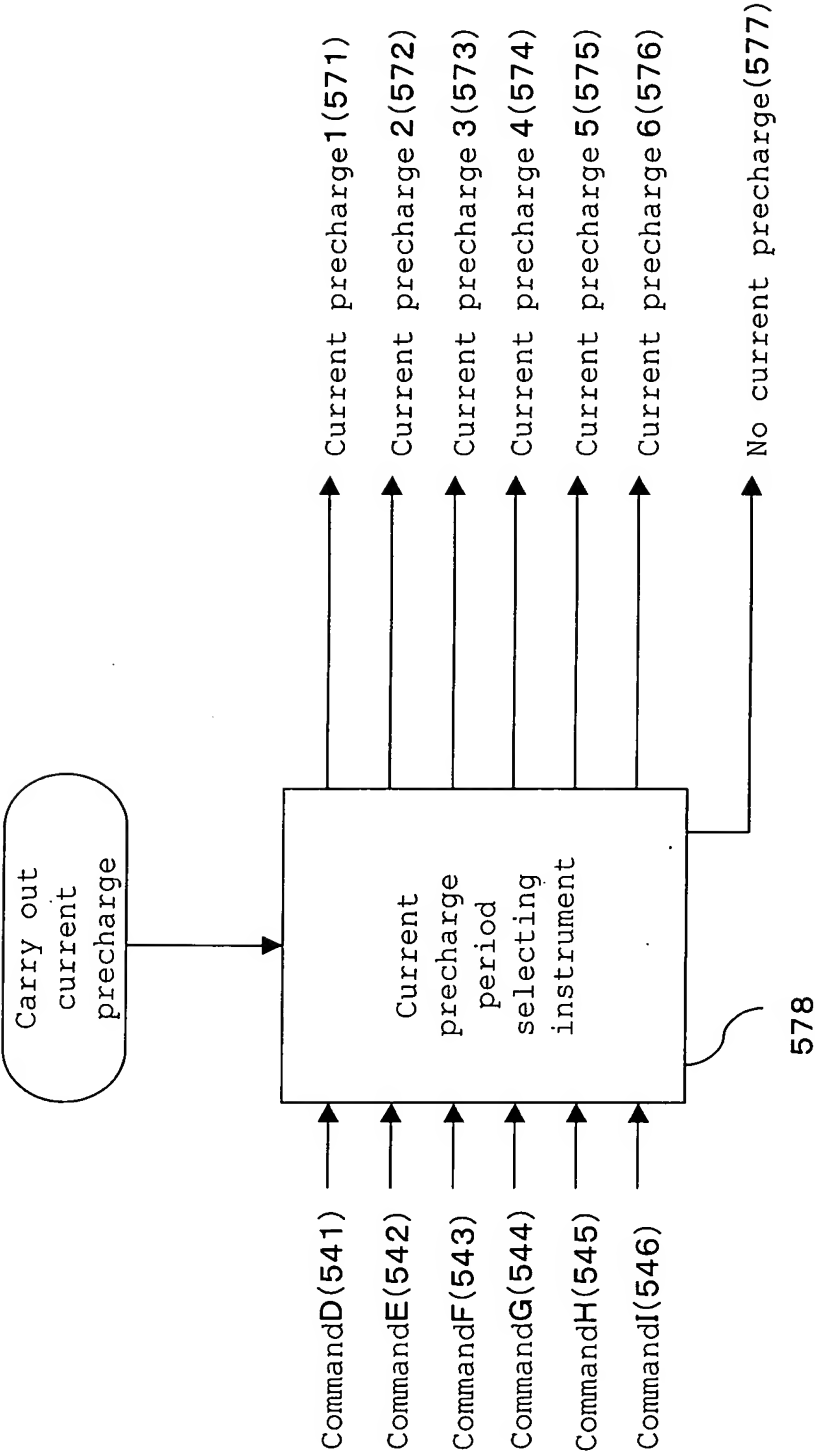
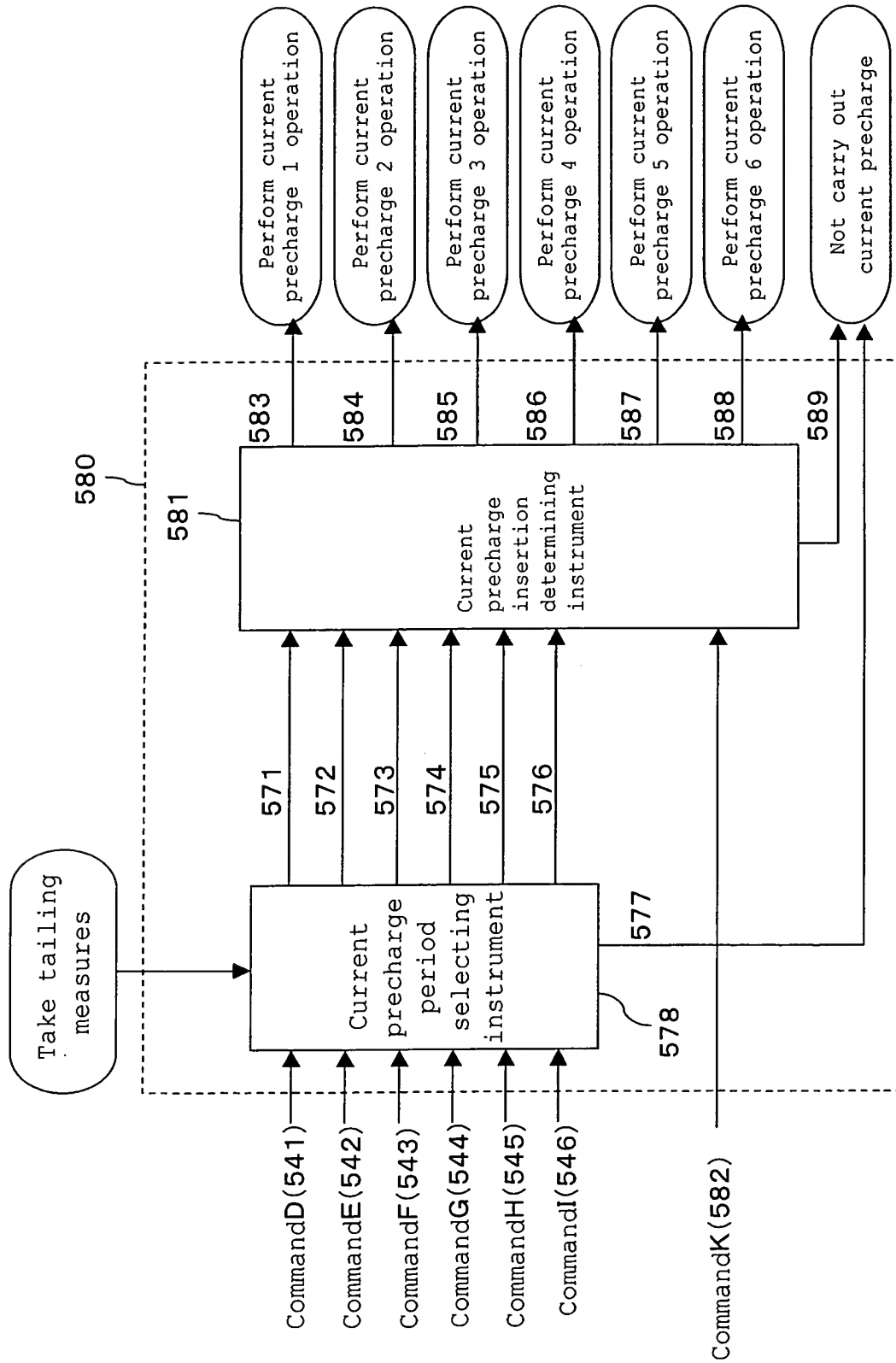


Fig. 57



58/190

Fig. 58



59/190

Fig. 59

Value for command K	Precharge pattern
0	Same as input current precharge pattern
1	
2	Not carry out current precharge for current recharge 6 operation and same as input current precharge pattern in other cases
3	Not carry out current precharge for current precharge 5 or 6 operation and same as input current precharge pattern in other cases
4	Not carry out current precharge for current precharge 4 to 6 operations and same as input current precharge pattern in other cases
5	Not carry out current precharge for current precharge 3 to 6 operations and same as input current precharge pattern in other cases
6	Not carry out current precharge for current precharge 2 to 6 operations and same as input current precharge pattern in other cases
7	Not carry out current precharge

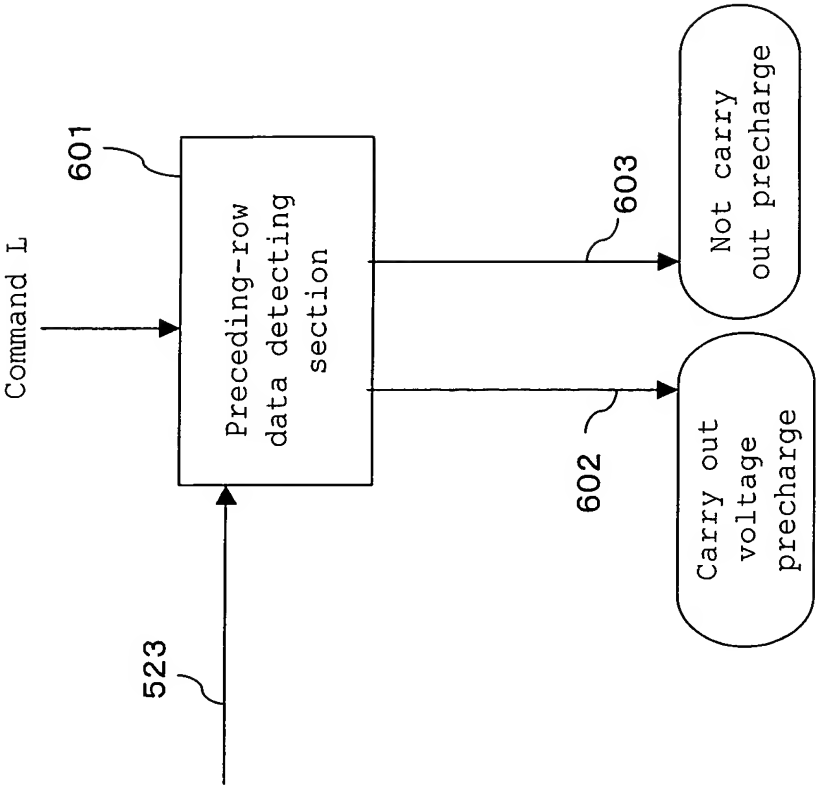


Fig. 60

Fig. 61

Value for command L	Precharge pattern
0	Not carry out voltage precharge
1	Carry out voltage precharge when data in preceding row is 0
2	Always carry out voltage precharge

62/190

Fig. 62

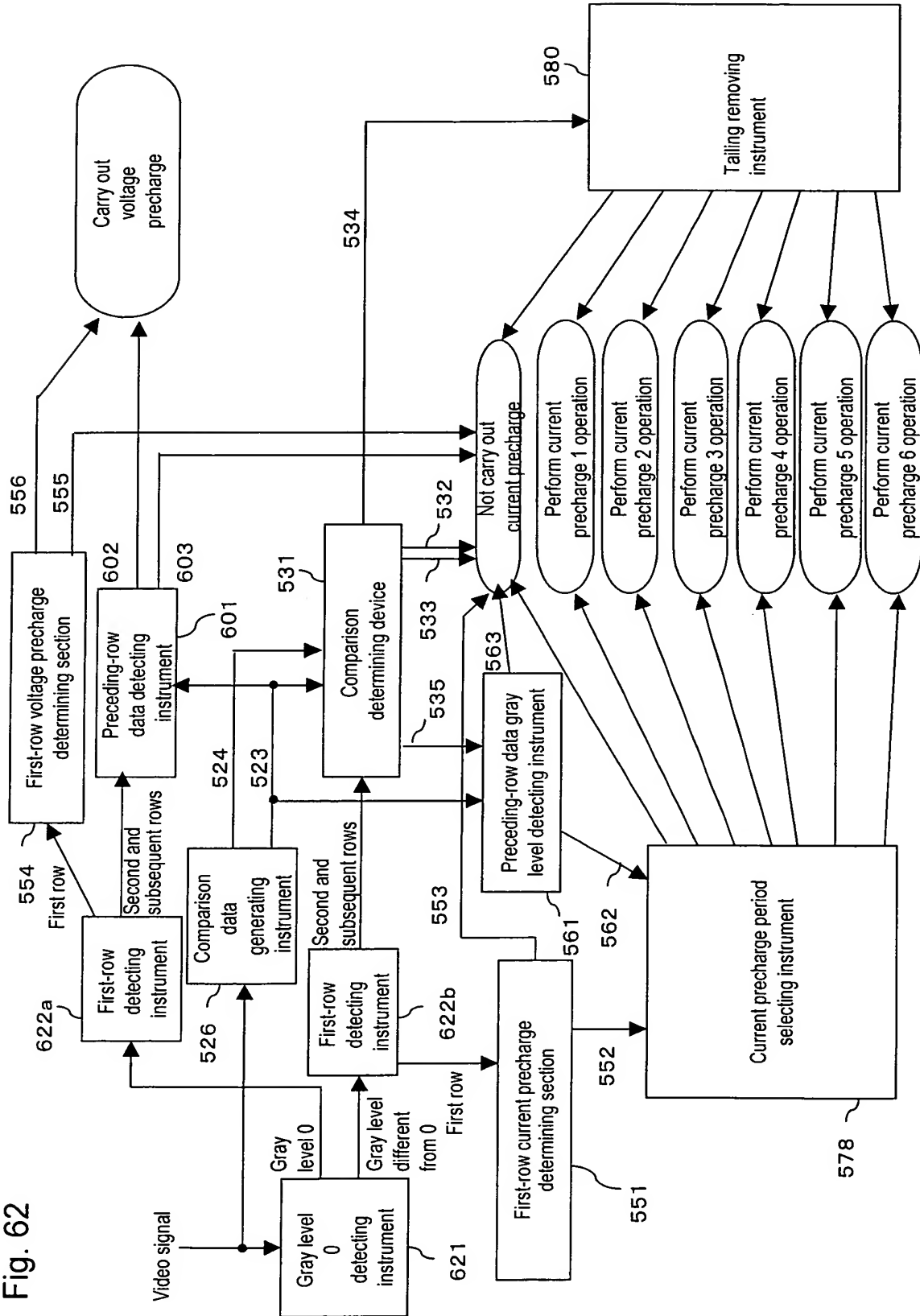
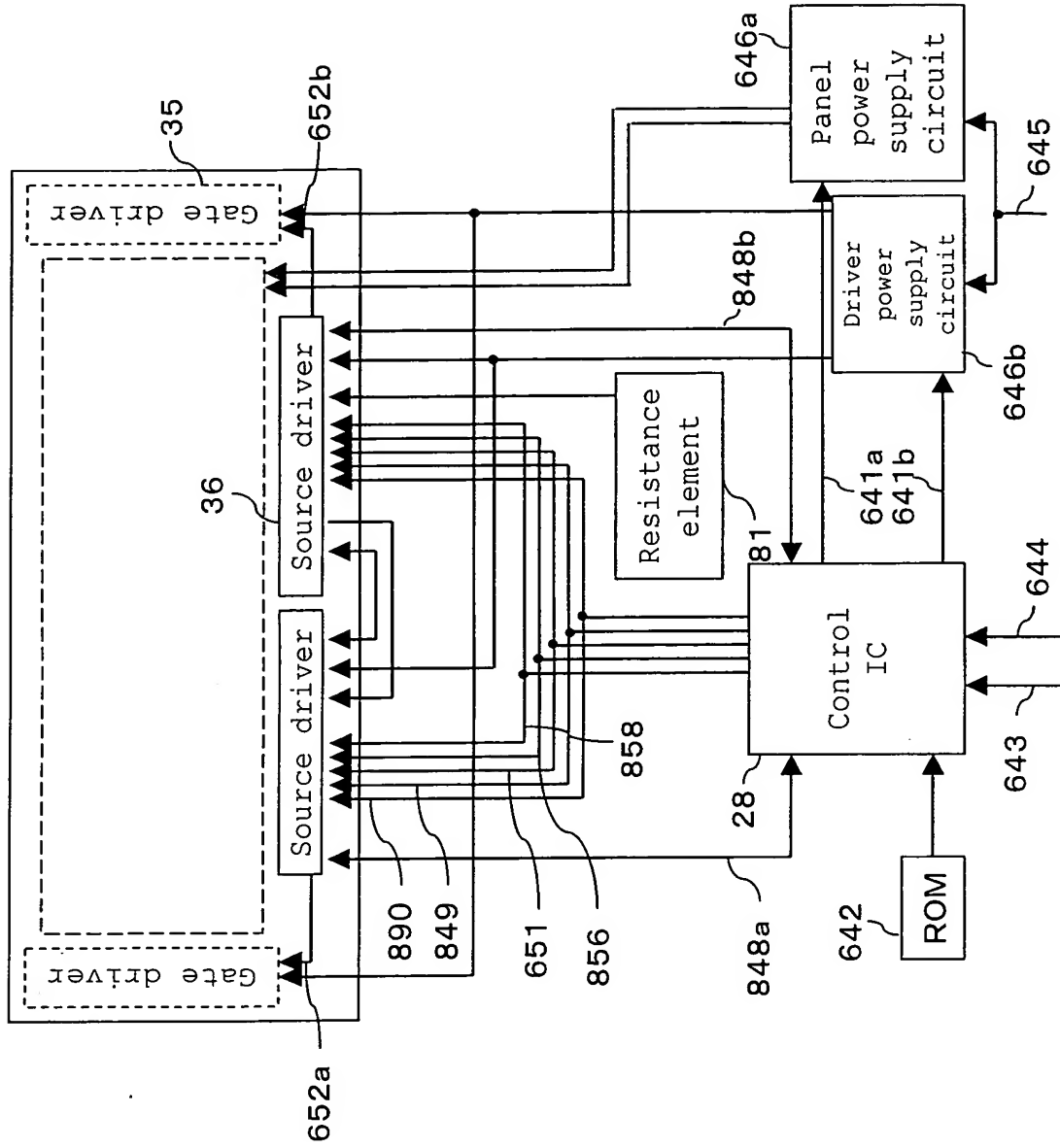


Fig. 63

Determination for precharge operation	Value for precharge determination signal (55)
Not carry out precharge	0
Perform current precharge 1 operation	1
Perform current precharge 2 operation	2
Perform current precharge 3 operation	3
Perform current precharge 4 operation	4
Perform current precharge 5 operation	5
Perform current precharge 6 operation	6
Carry out voltage precharge	7

64/190

Fig. 64



65/190

Fig. 65

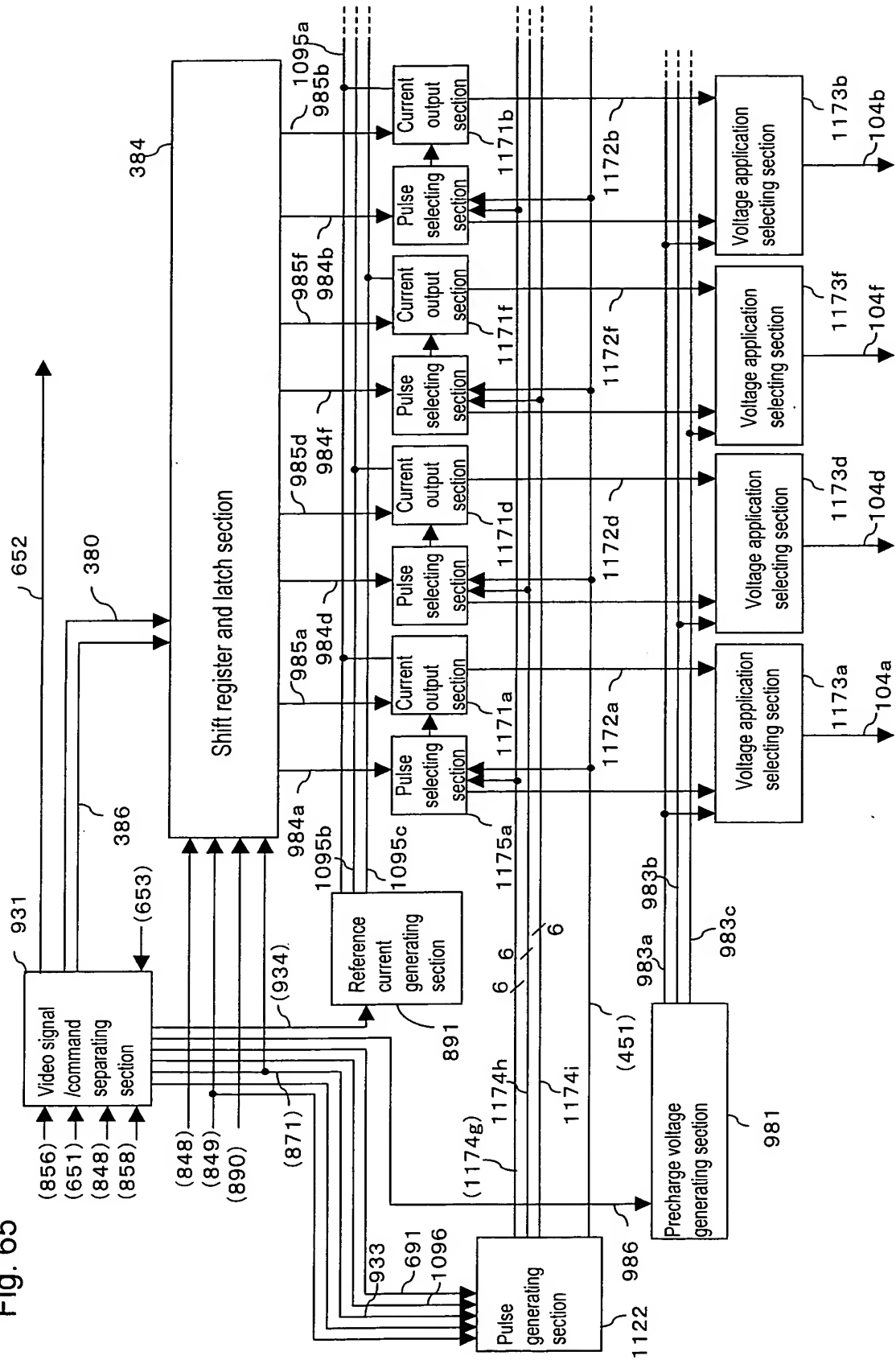
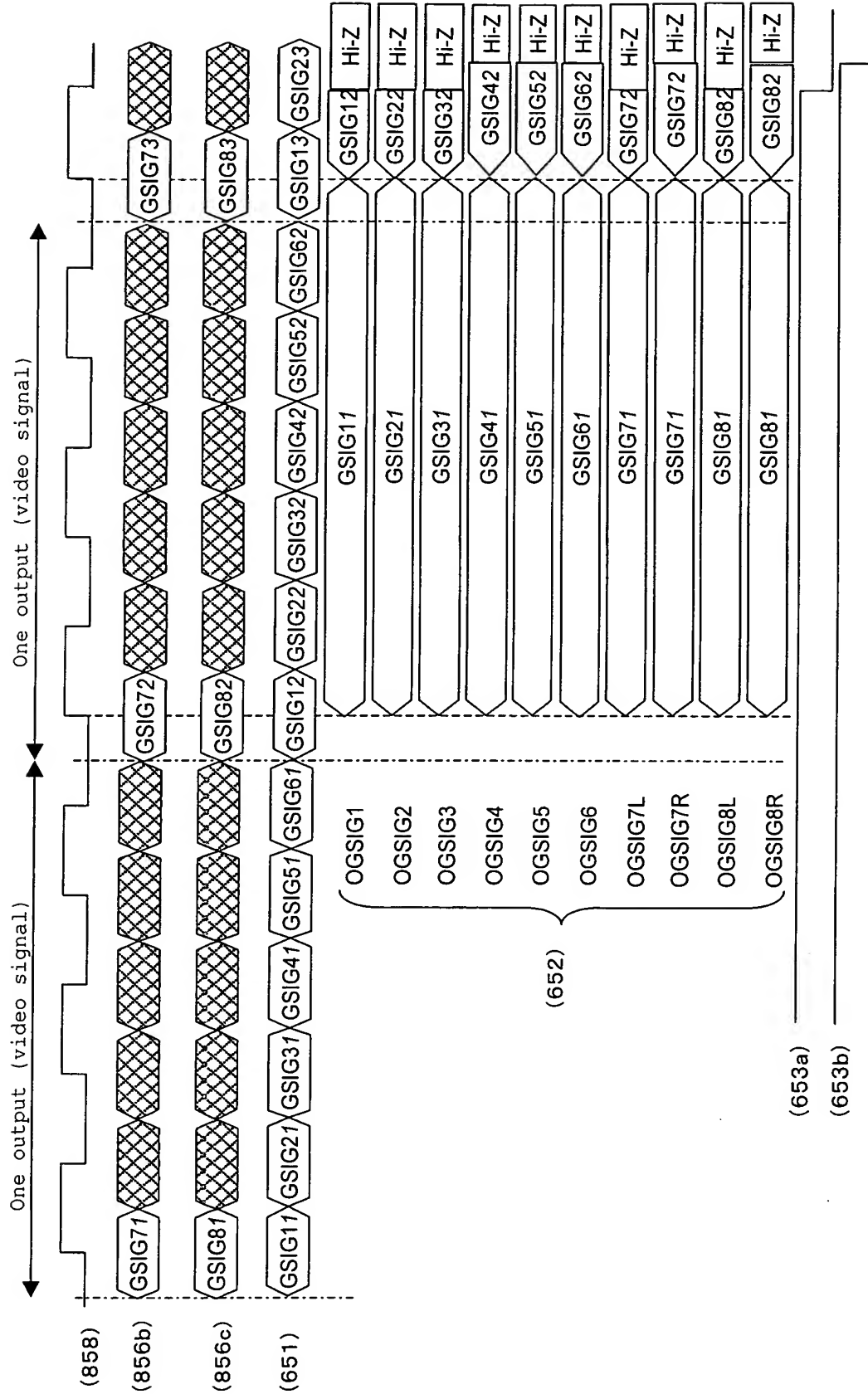


Fig. 66



67/190

Fig. 67

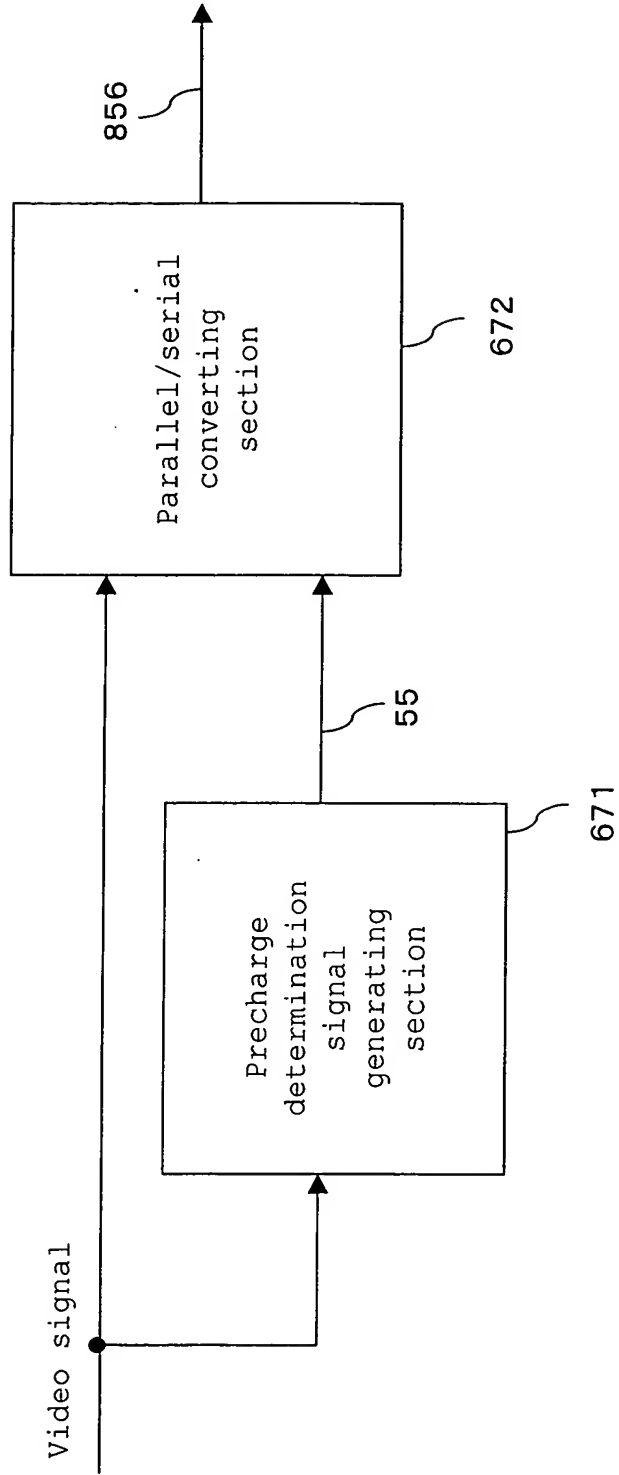


Fig. 68

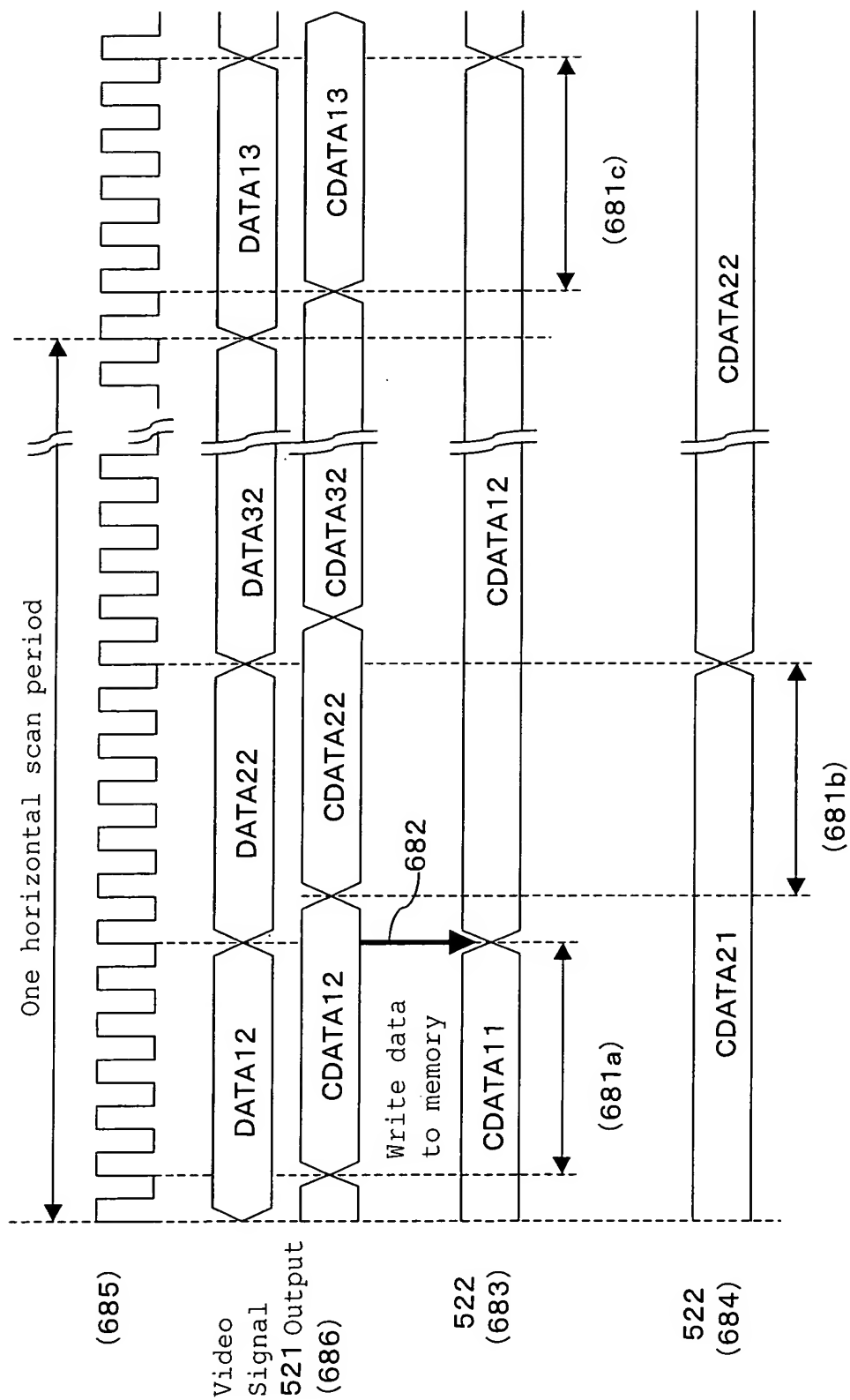
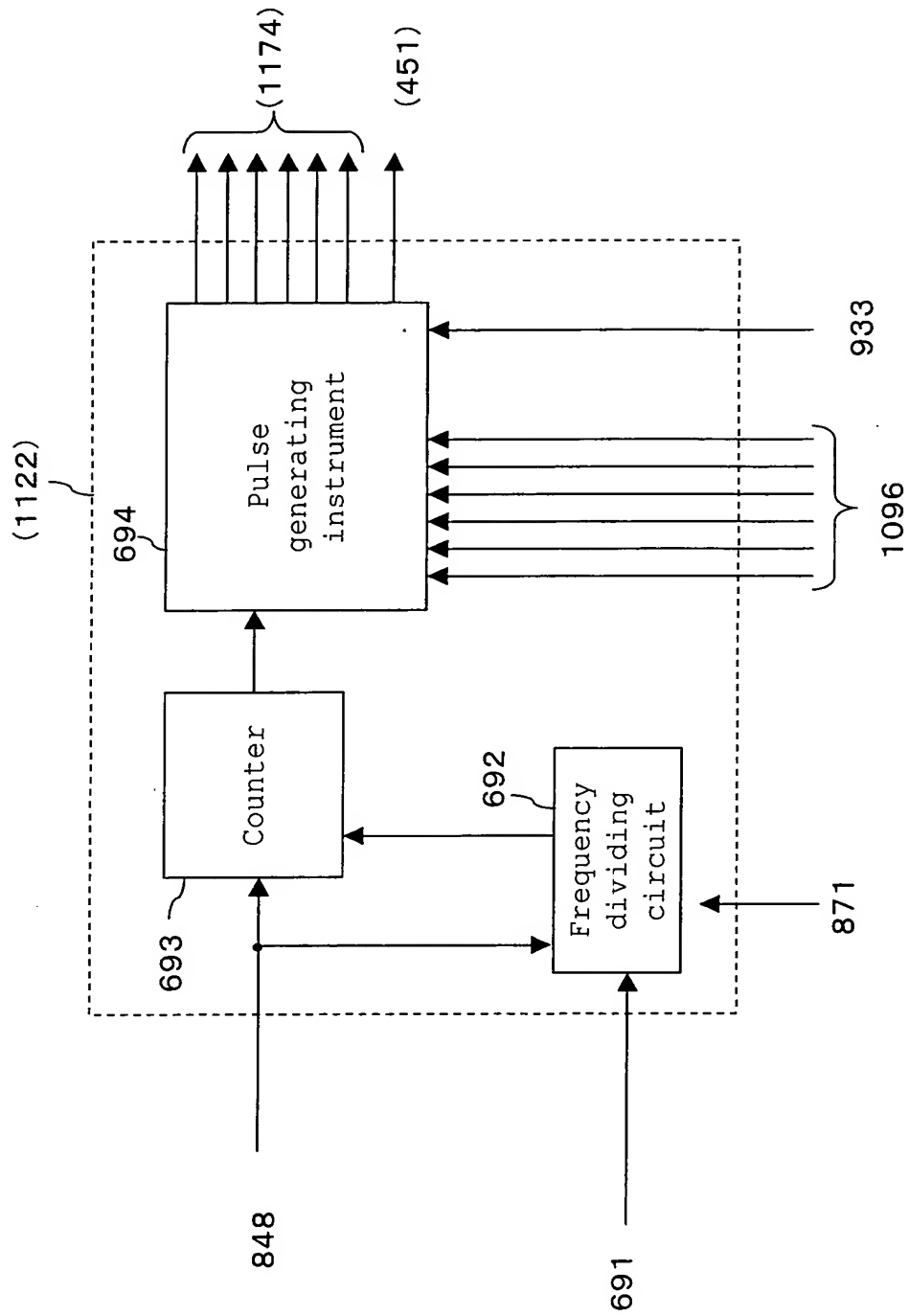


Fig. 69



70/190

Fig. 70

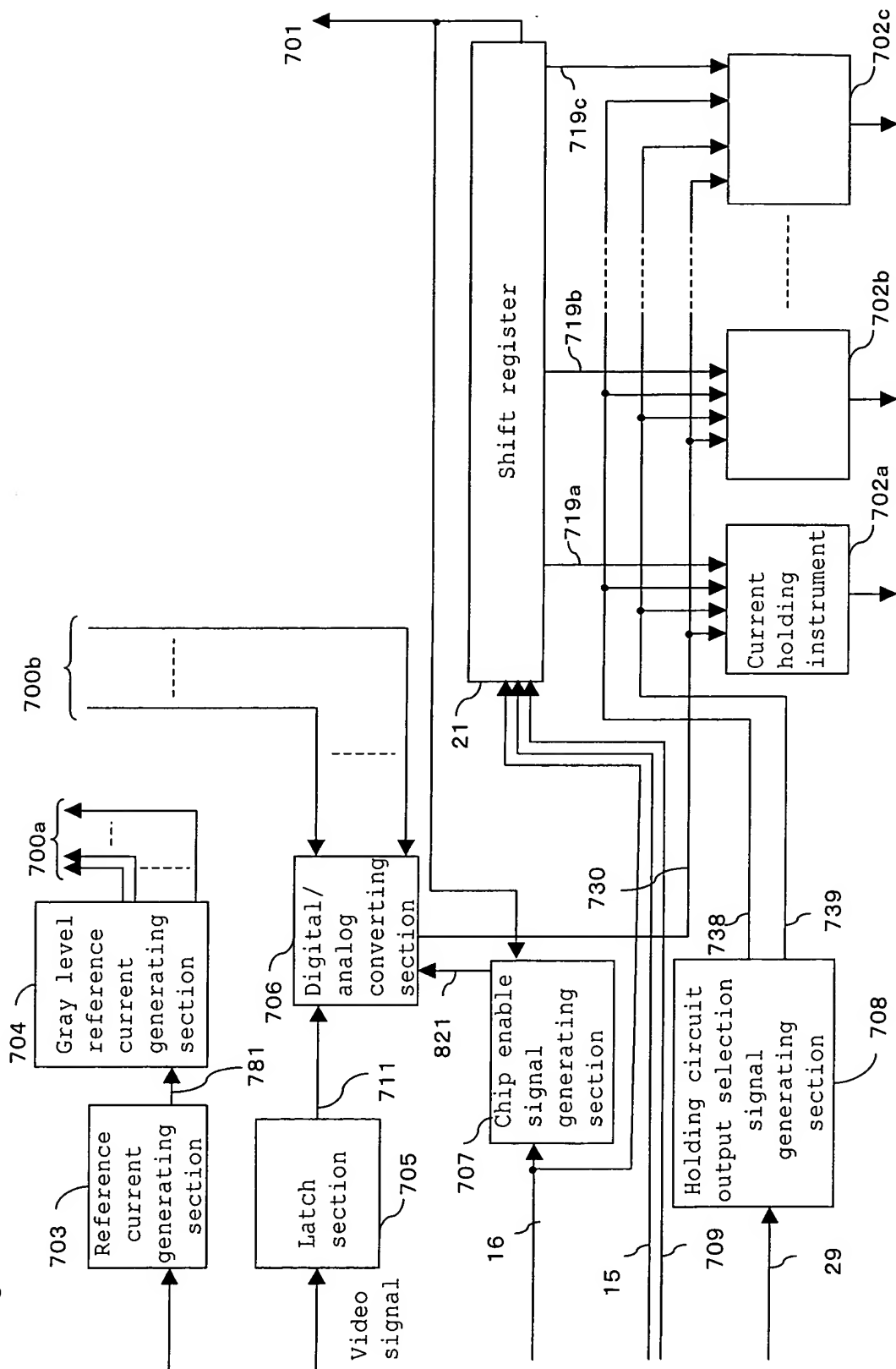
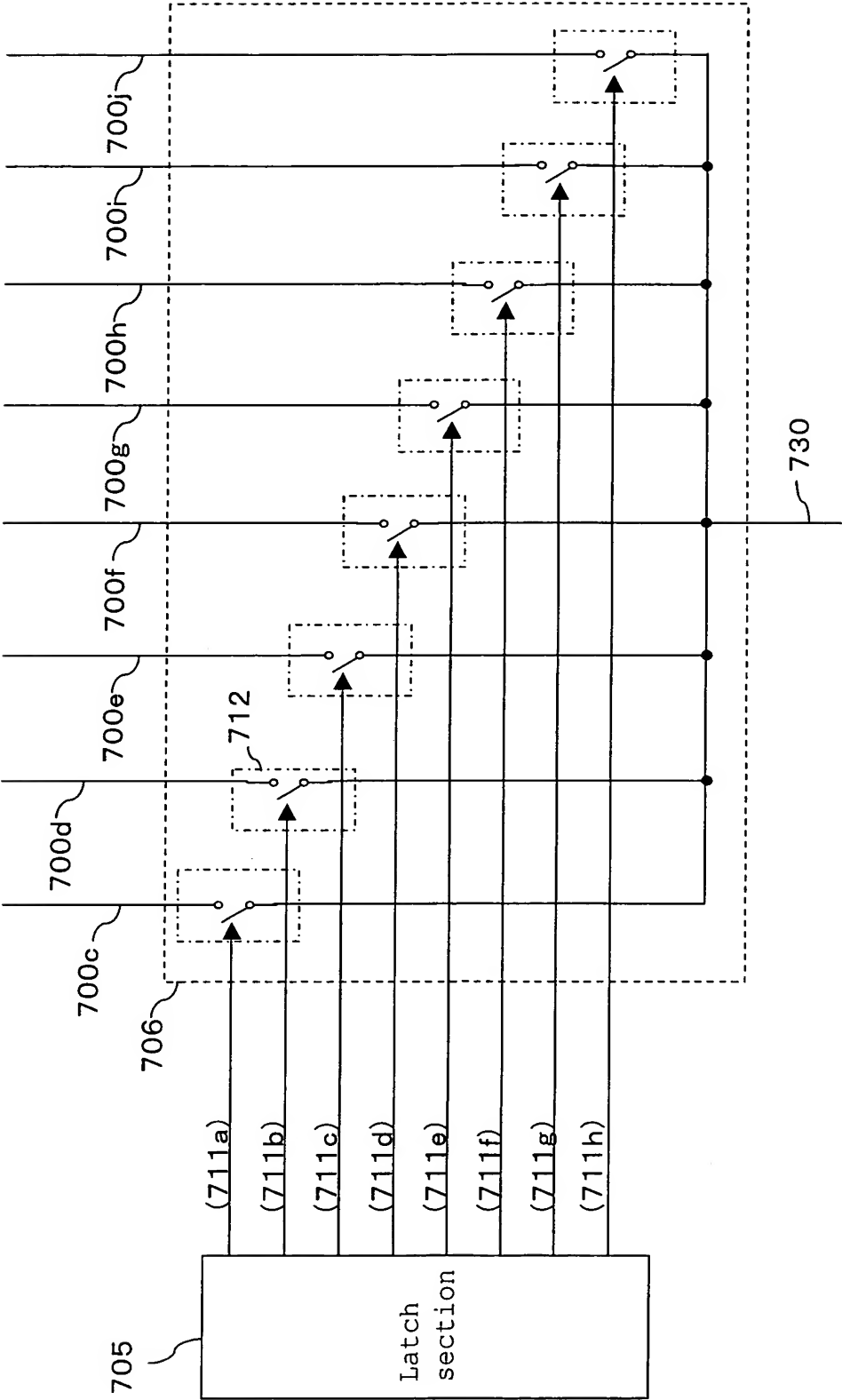
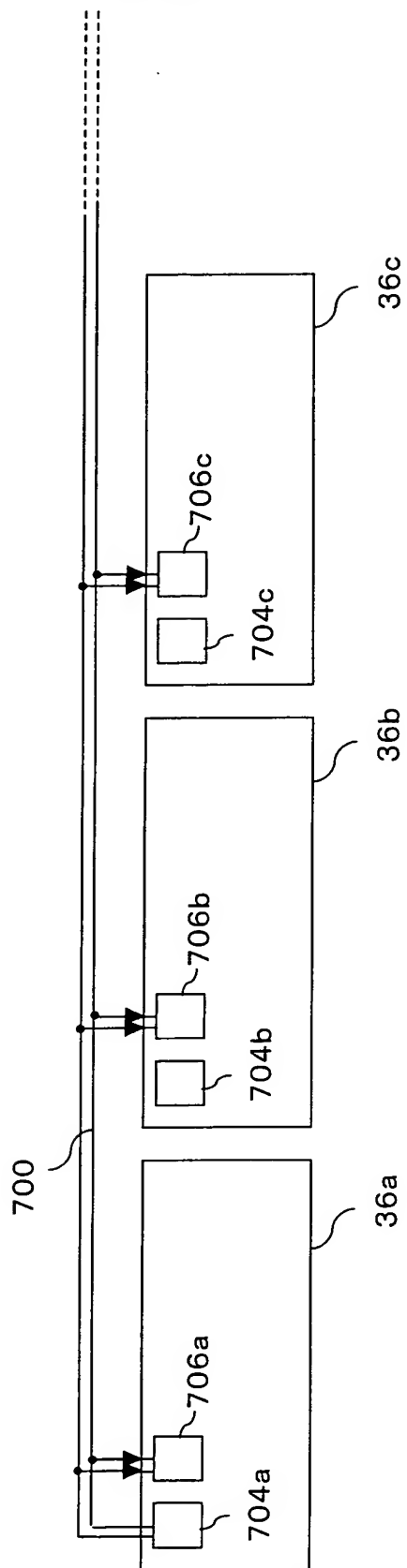


Fig. 71

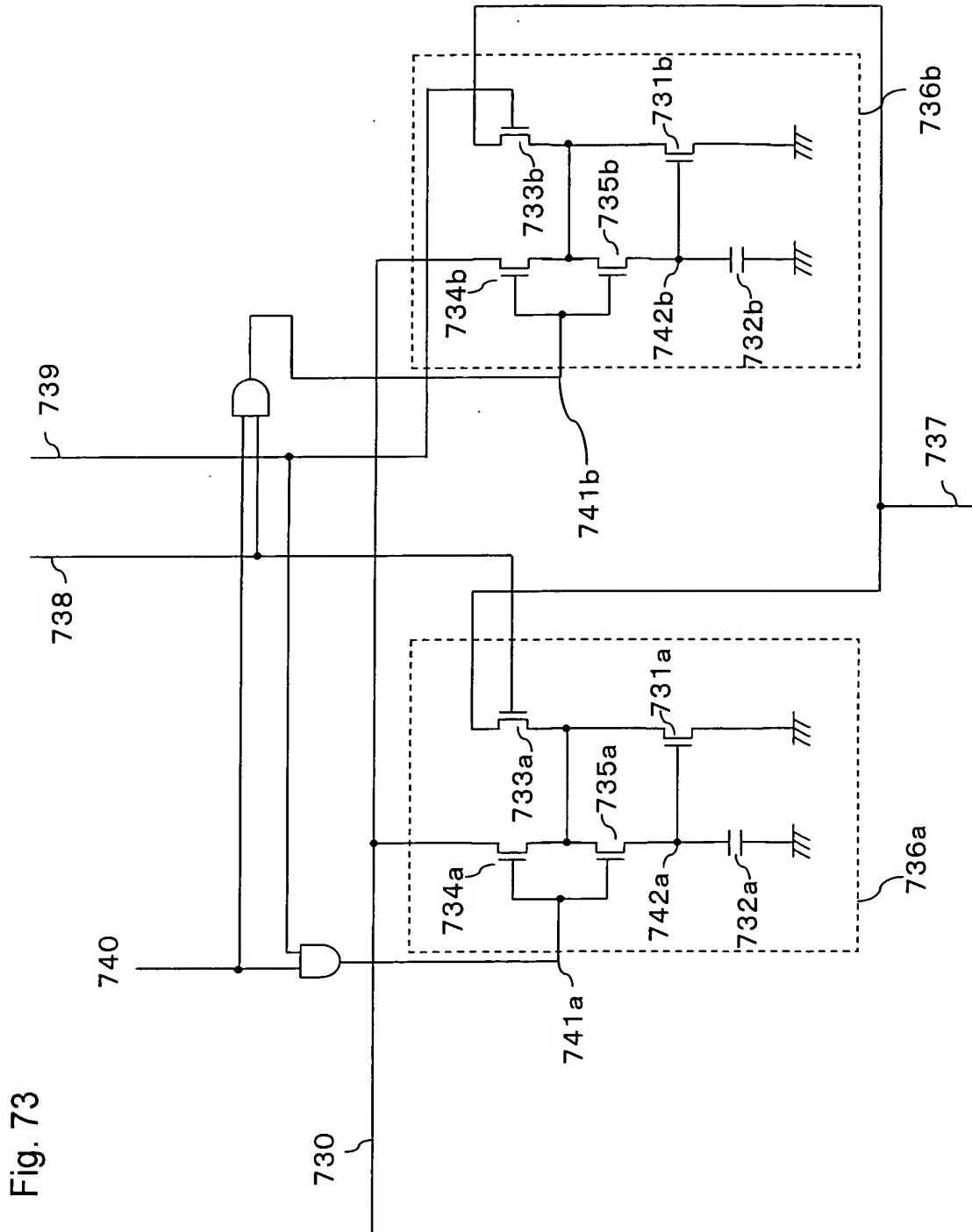


72/190

Fig. 72

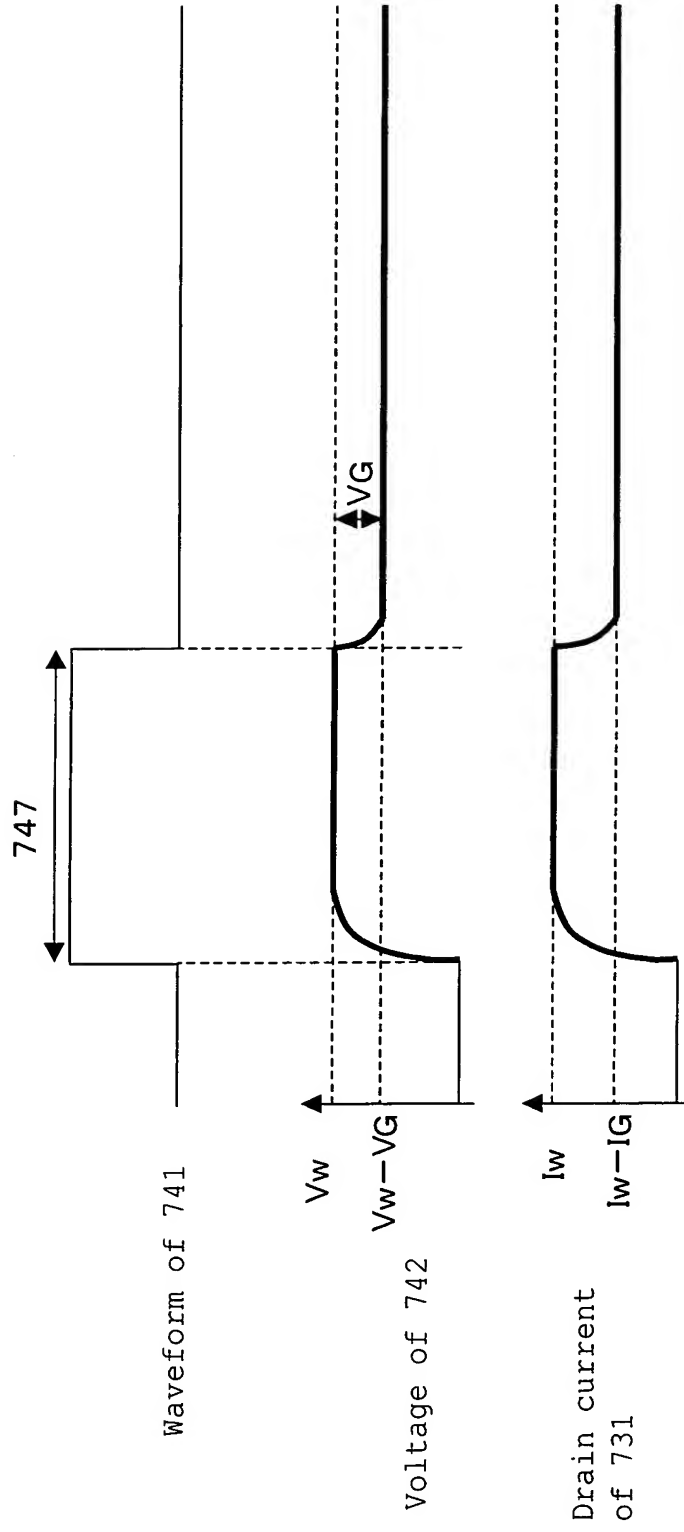


73/190



74/190

Fig. 74



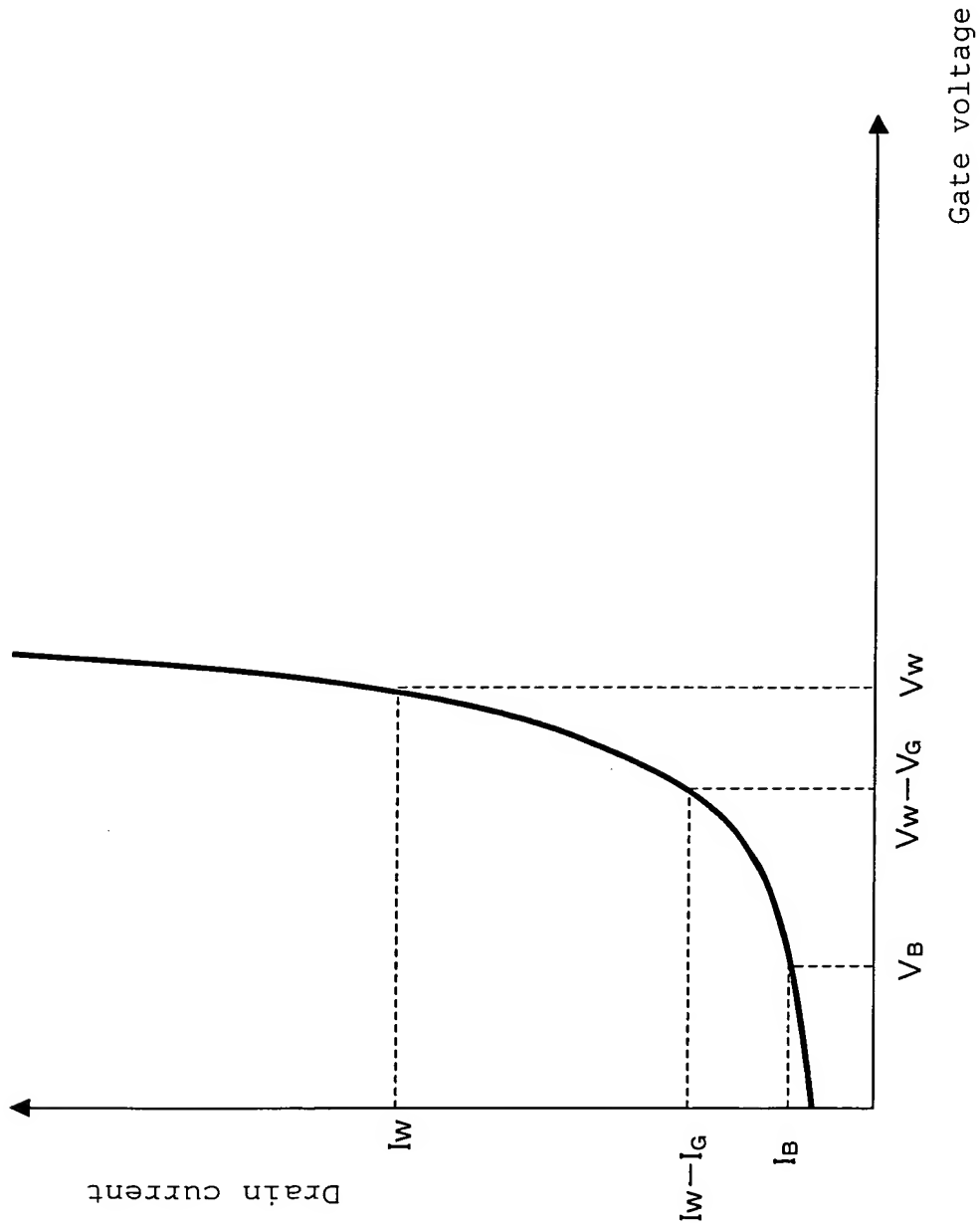
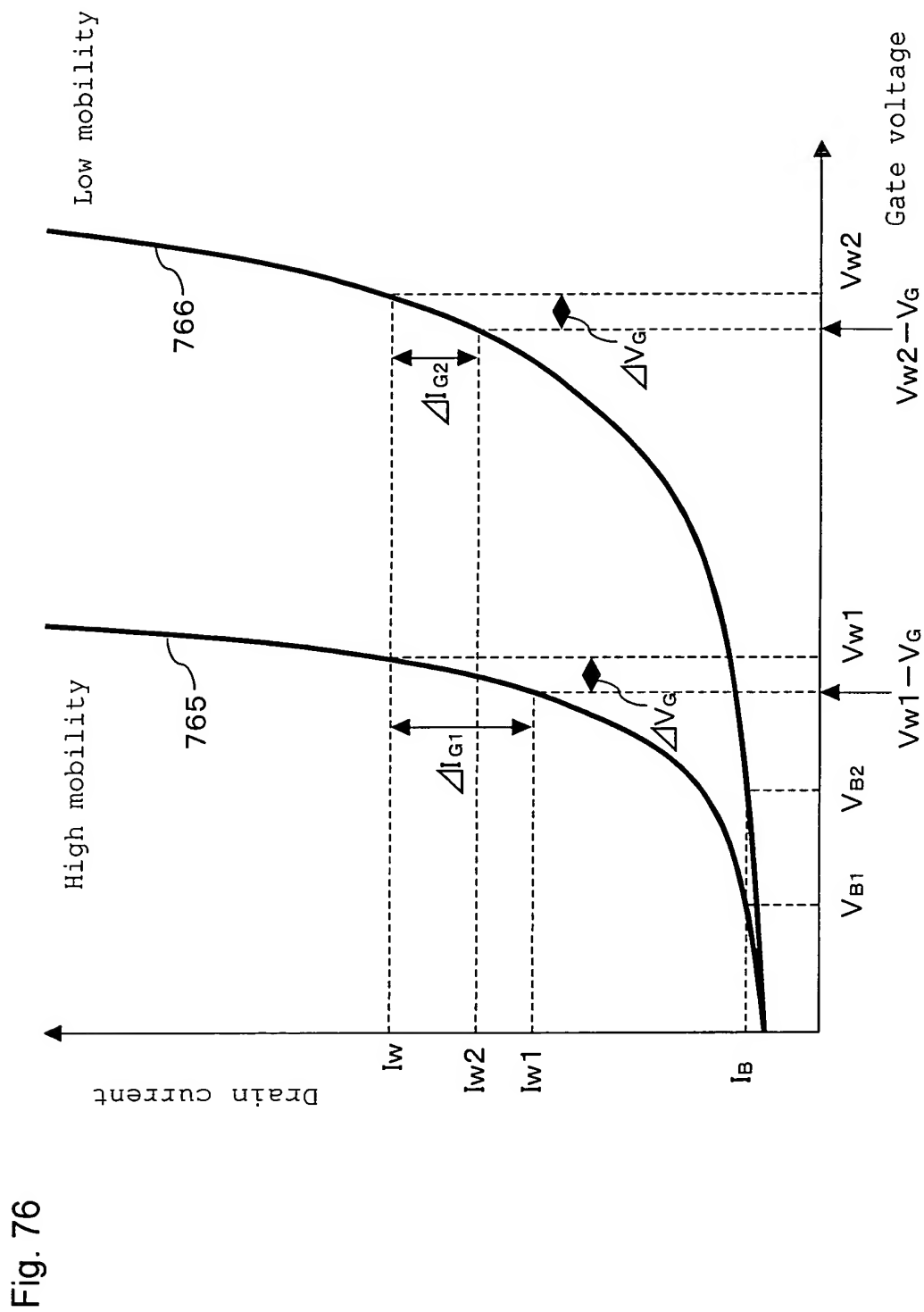
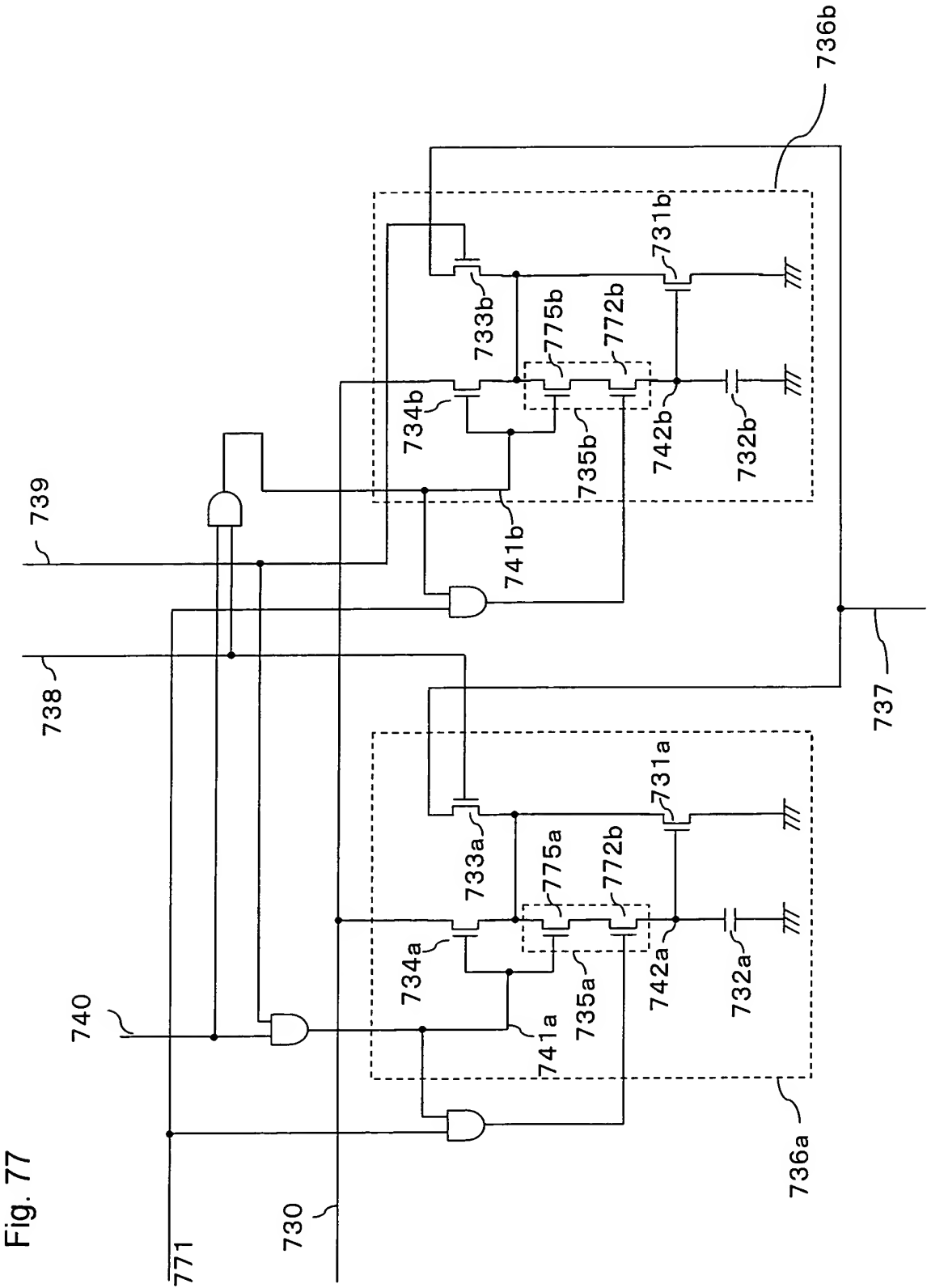


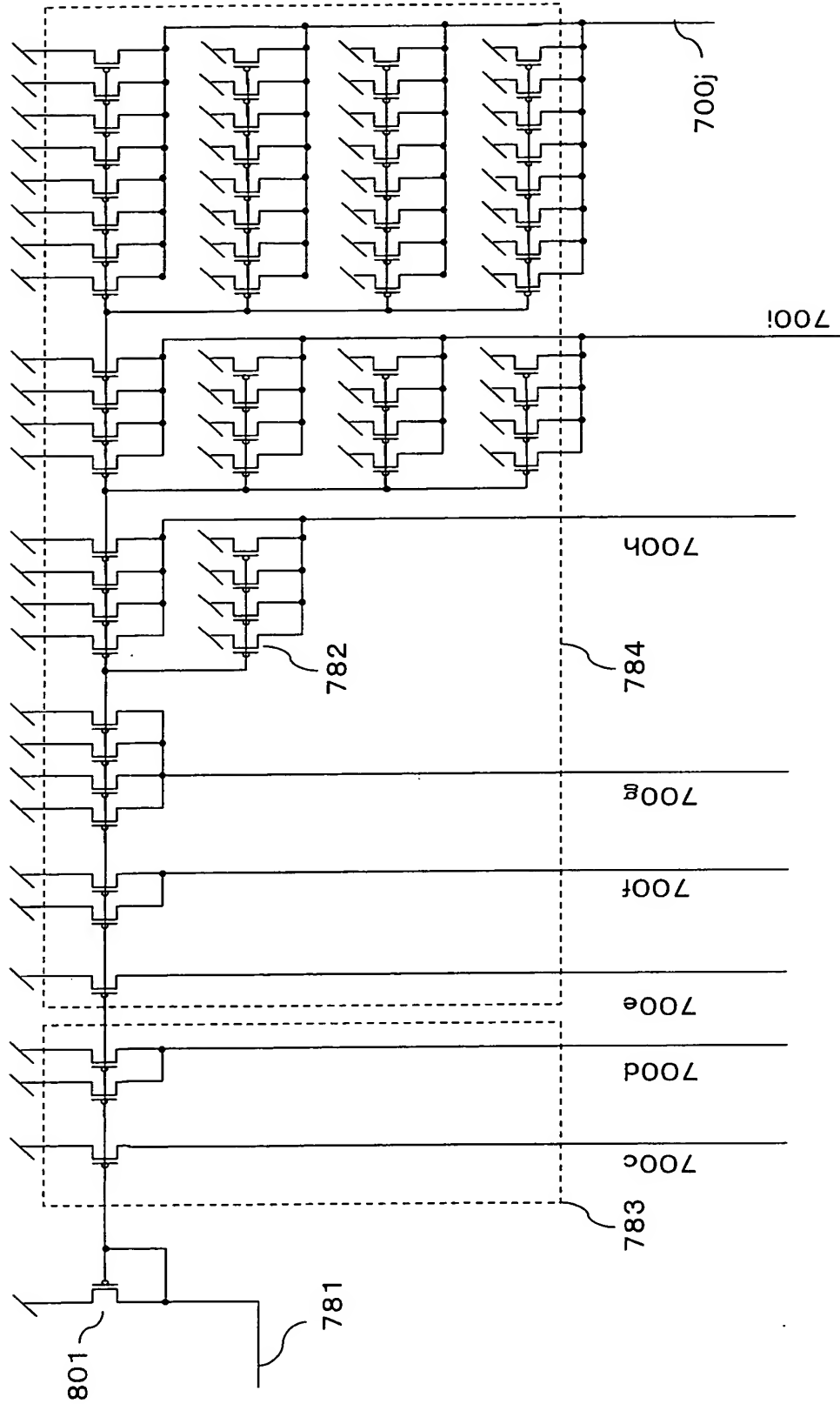
Fig. 75





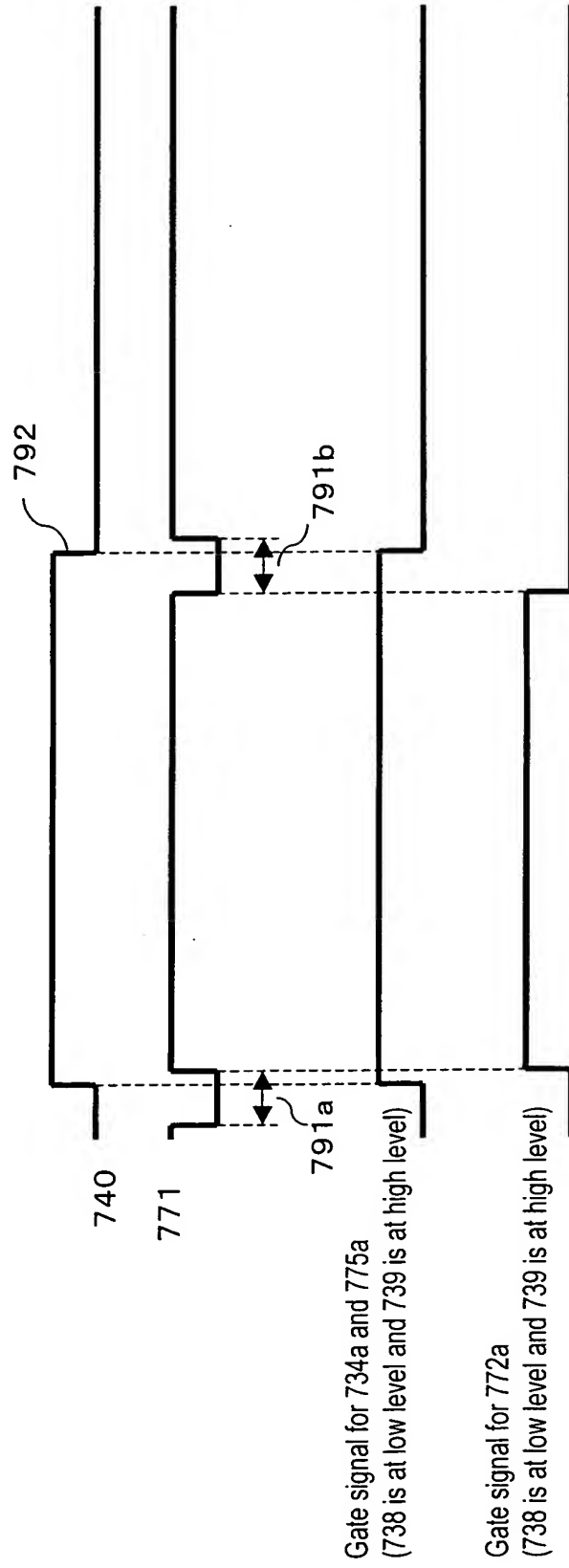
78/190

Fig. 78



79/190

Fig. 79



80/190

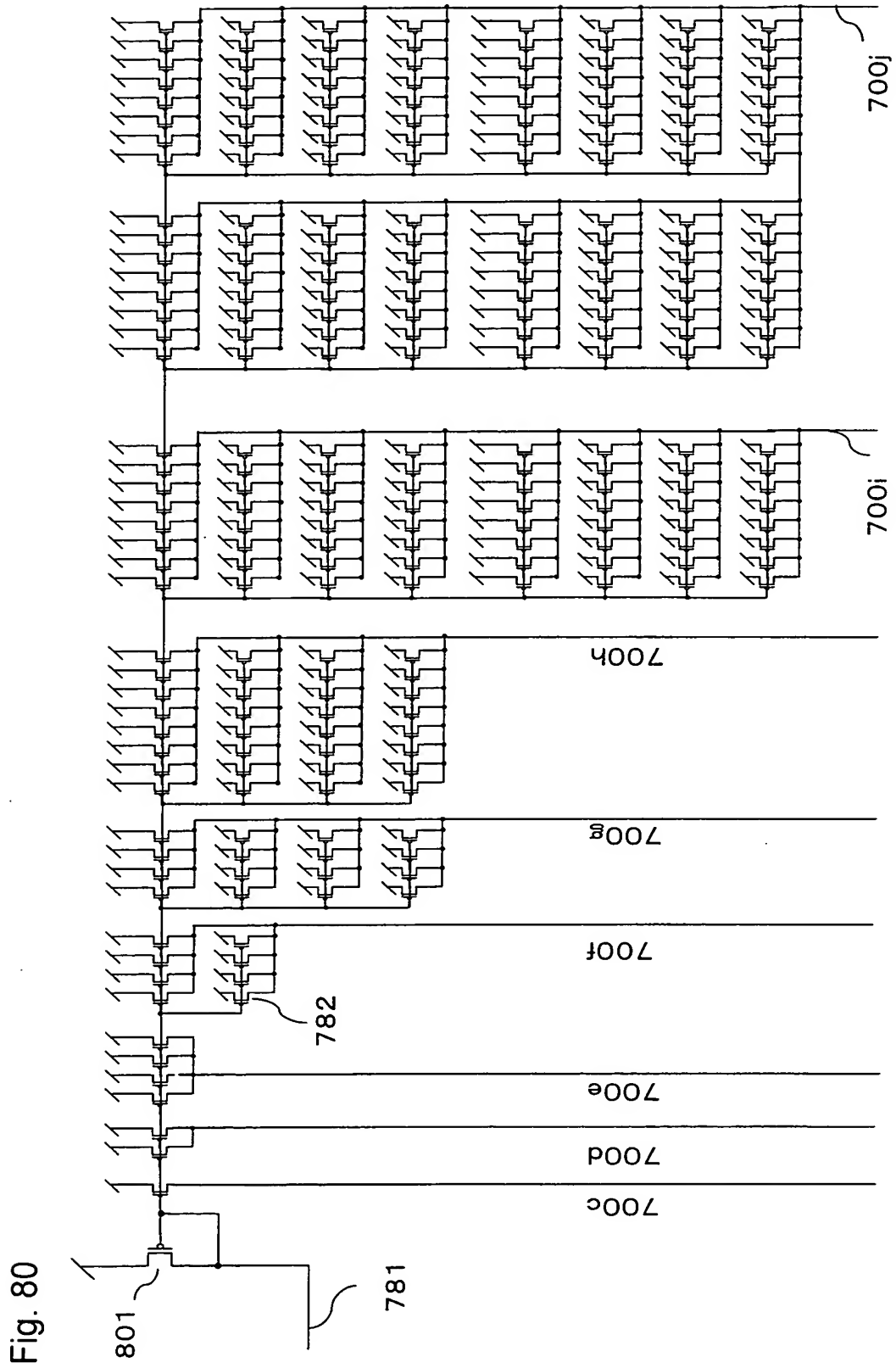
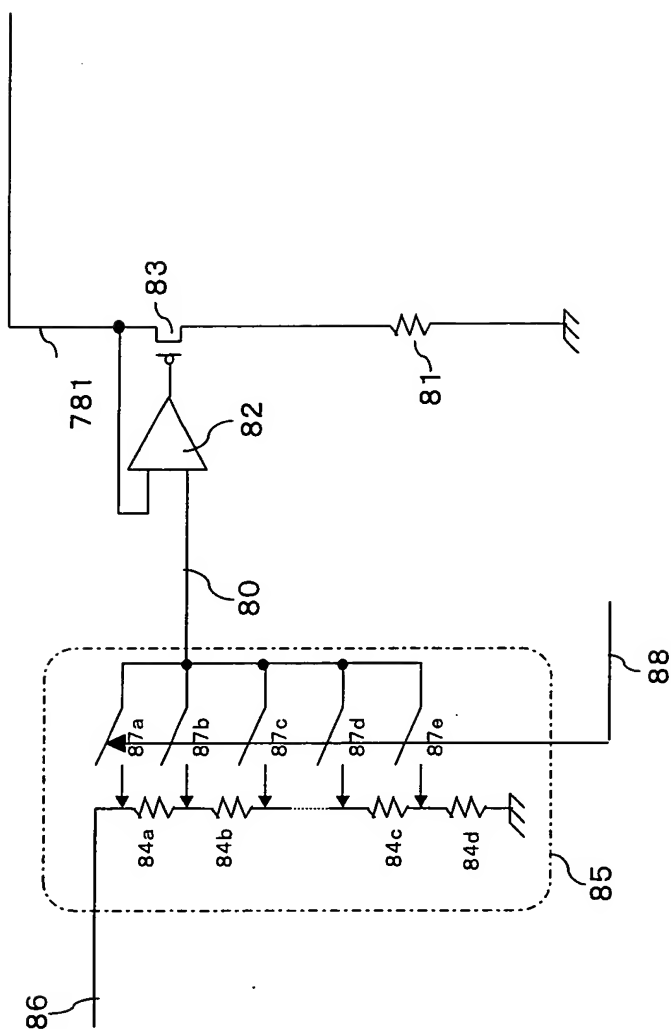


Fig. 81



82/190

Fig. 82

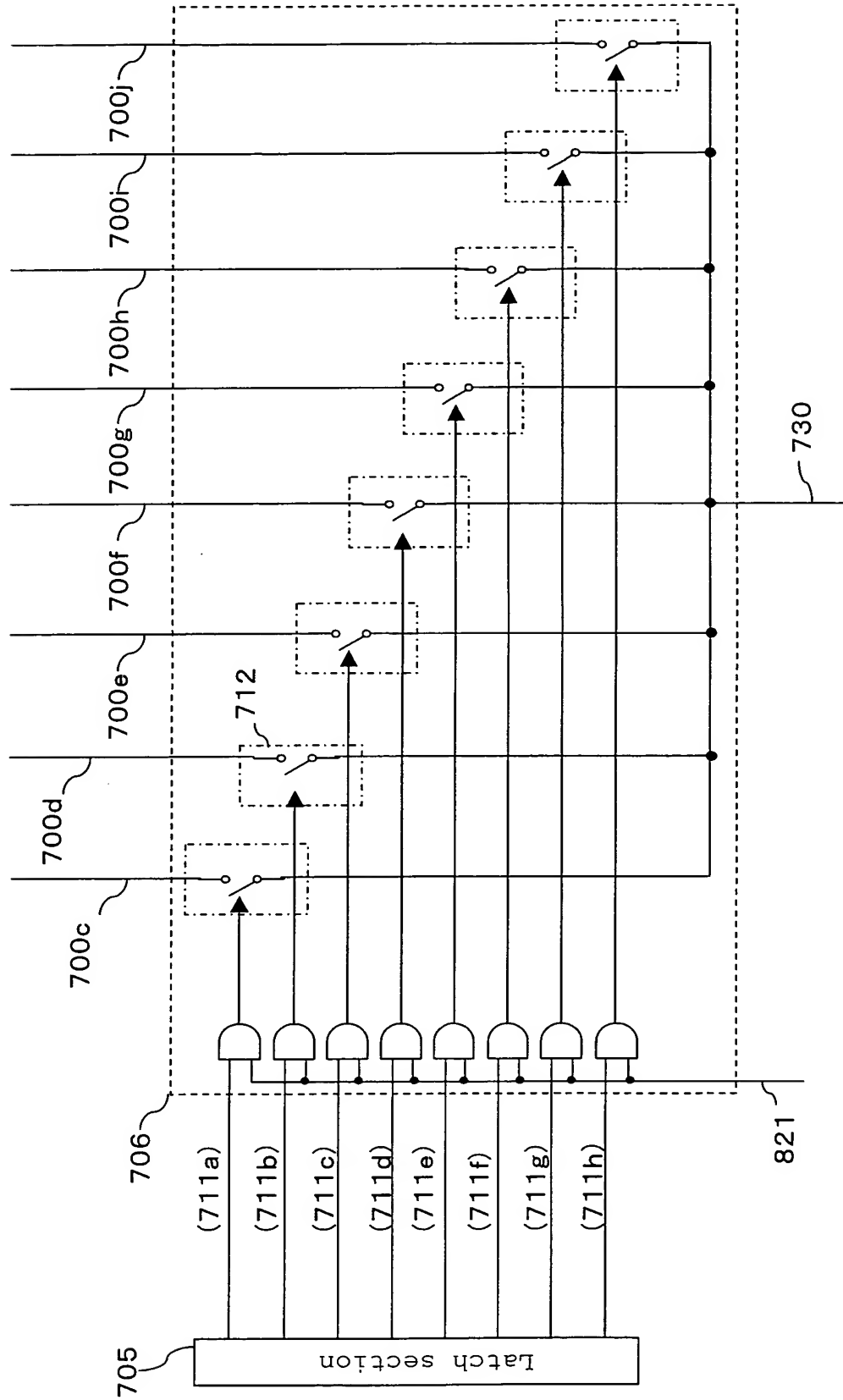
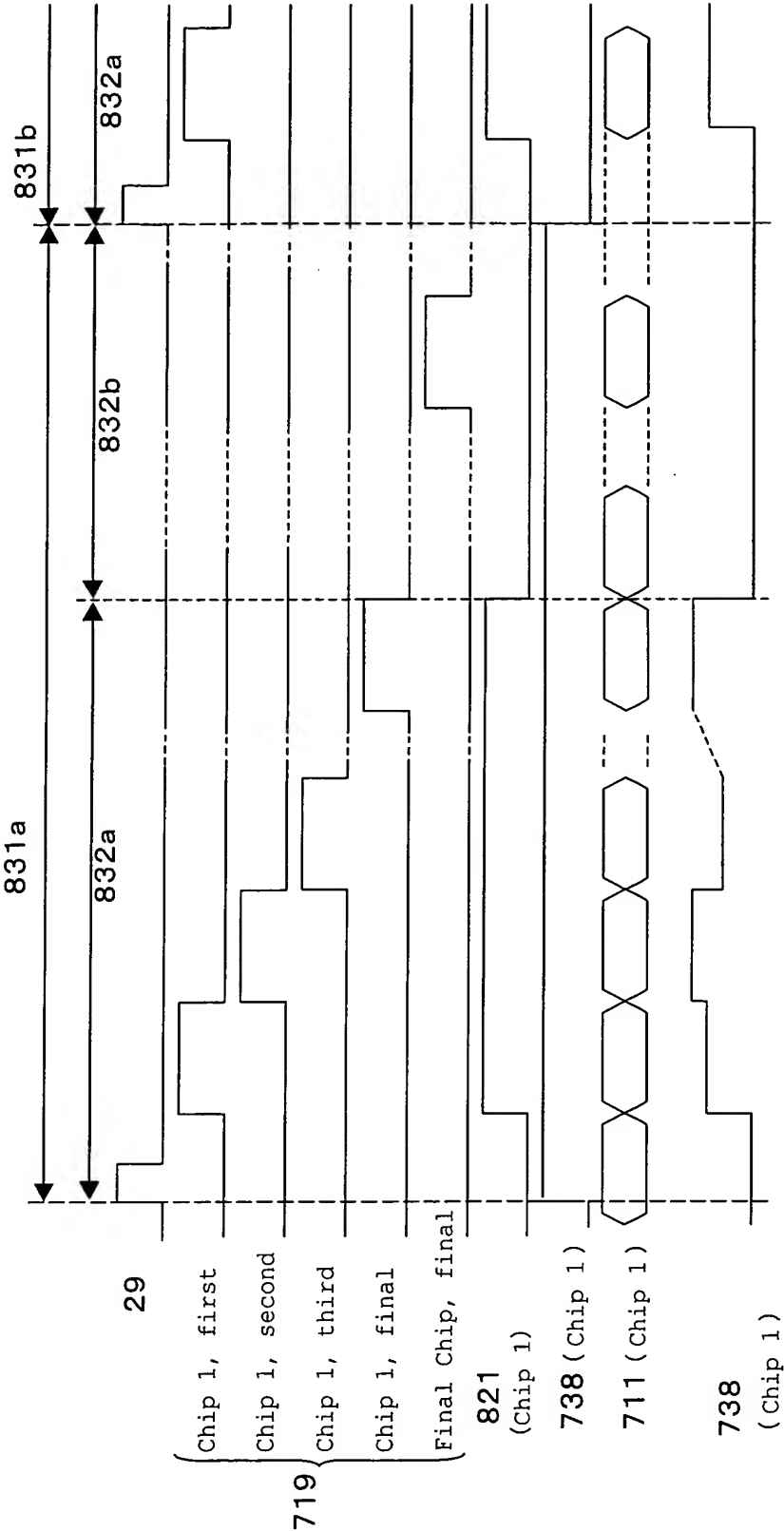


Fig. 83



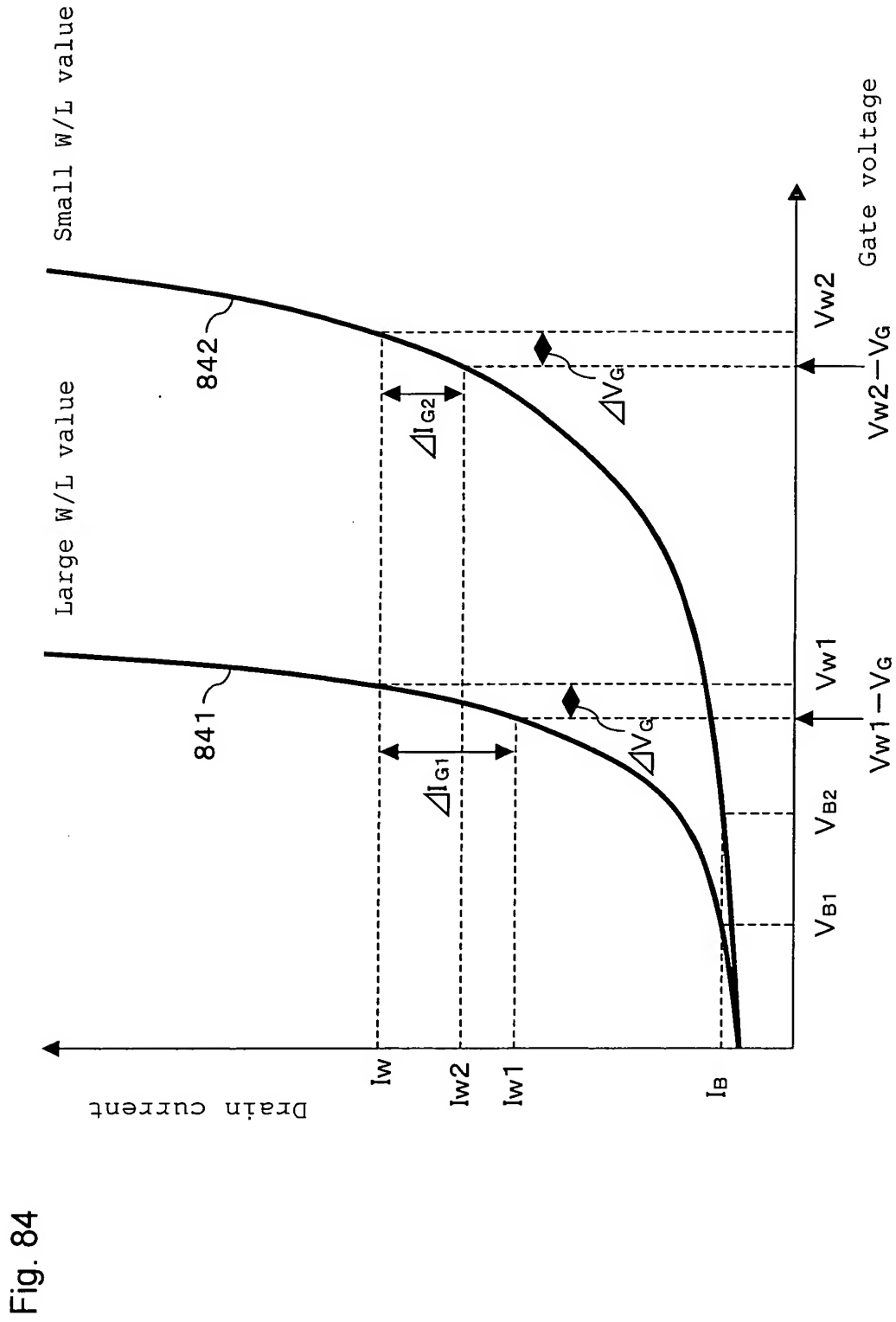


Fig. 86

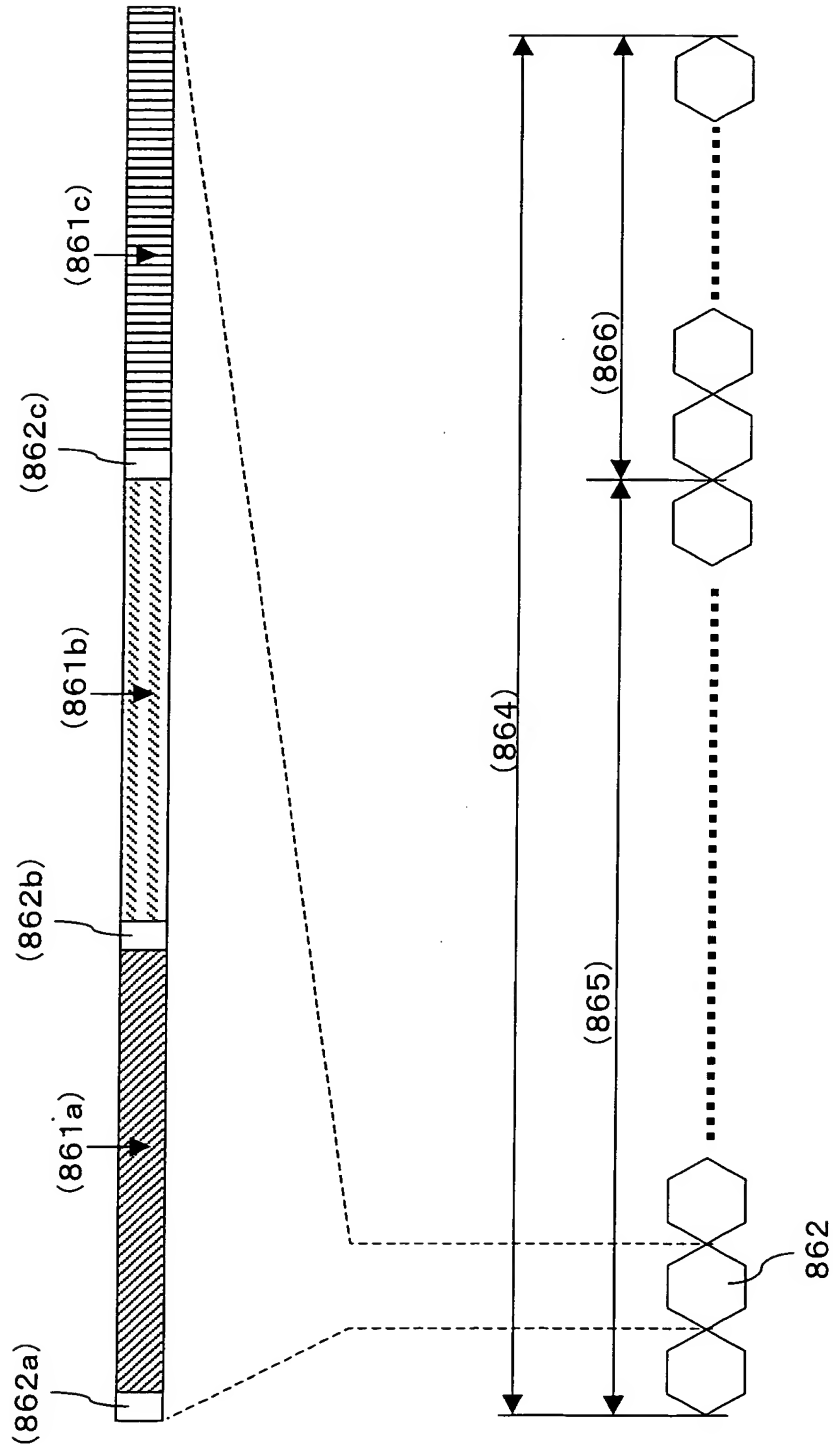


Fig. 87

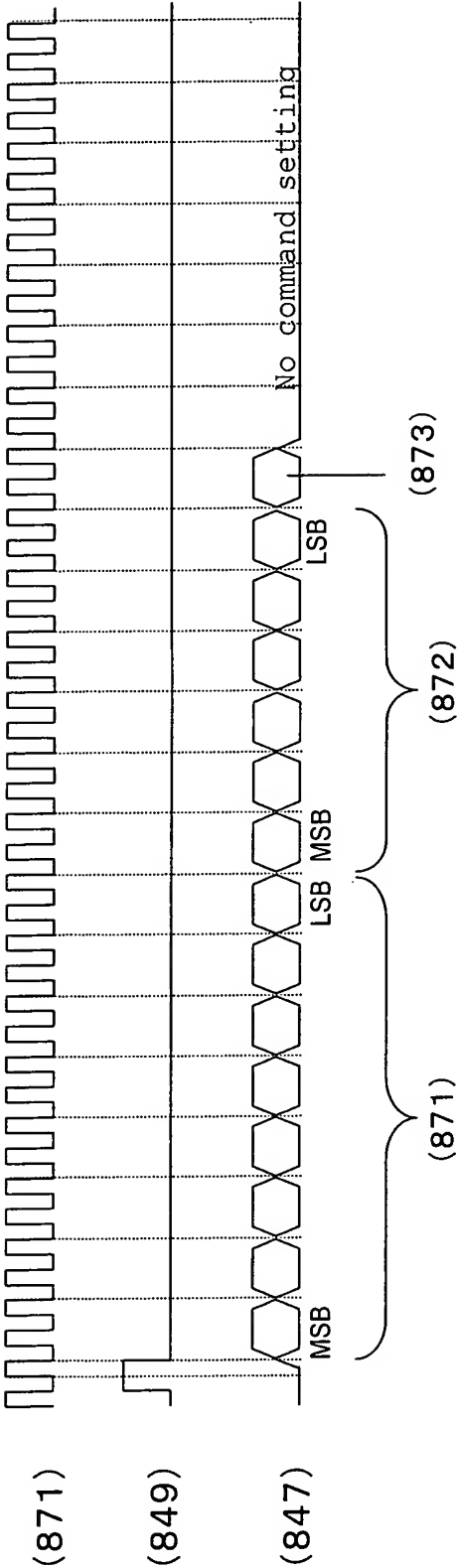
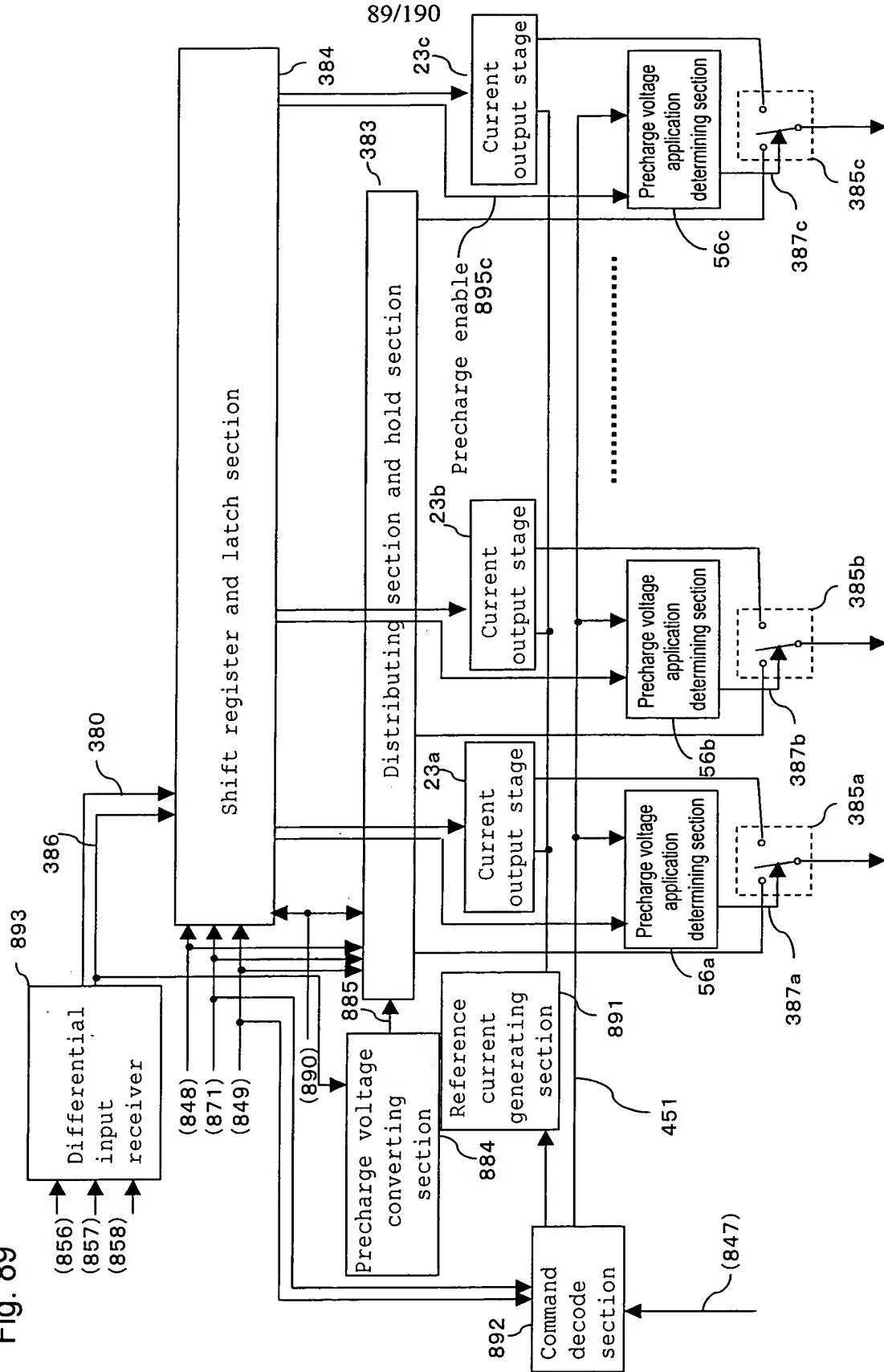


Fig. 89



90/190

Fig. 90

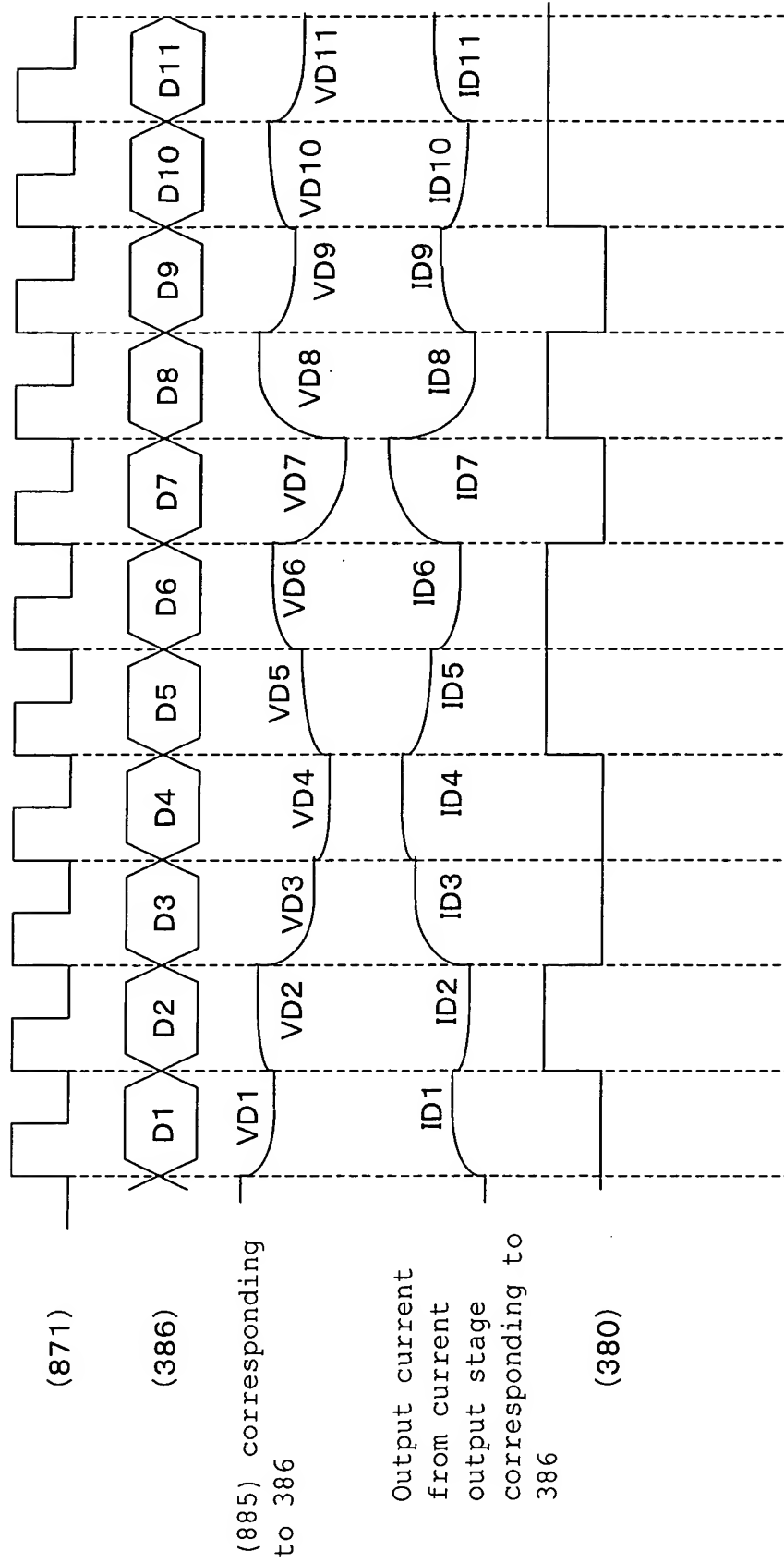


Fig. 91 (a)

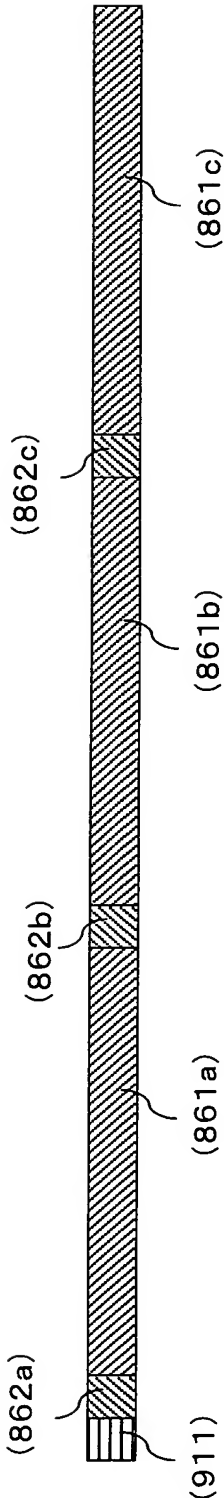


Fig. 91 (b)

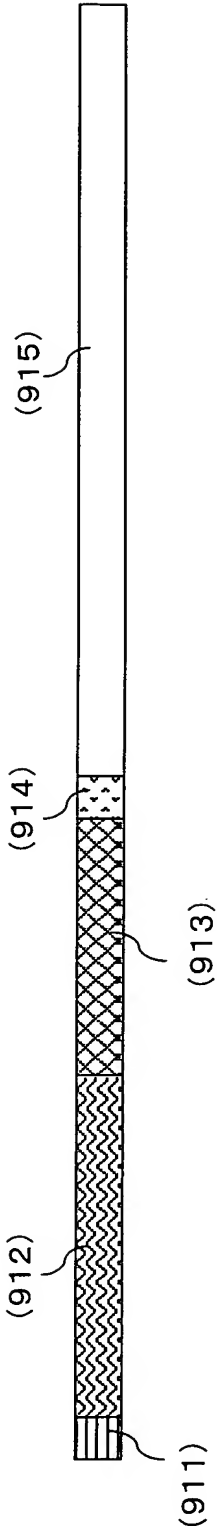


Fig. 92

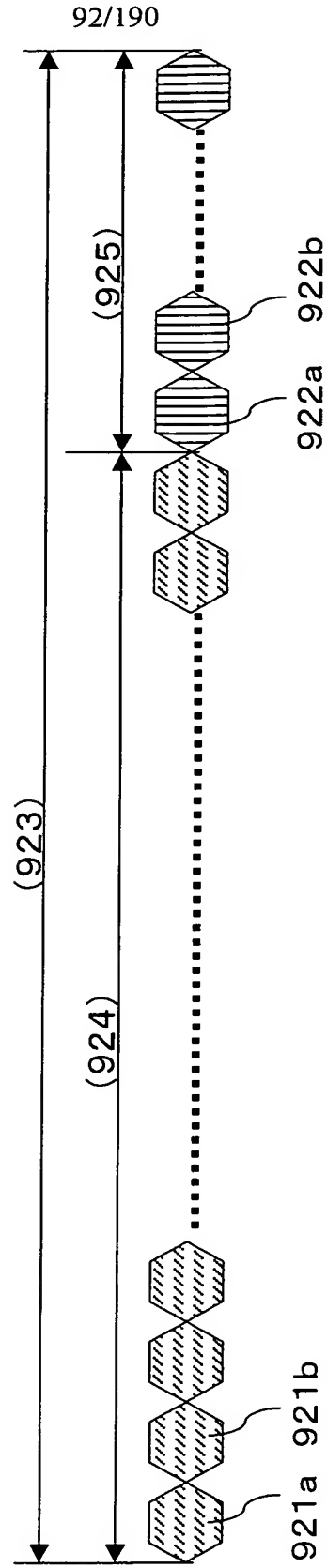
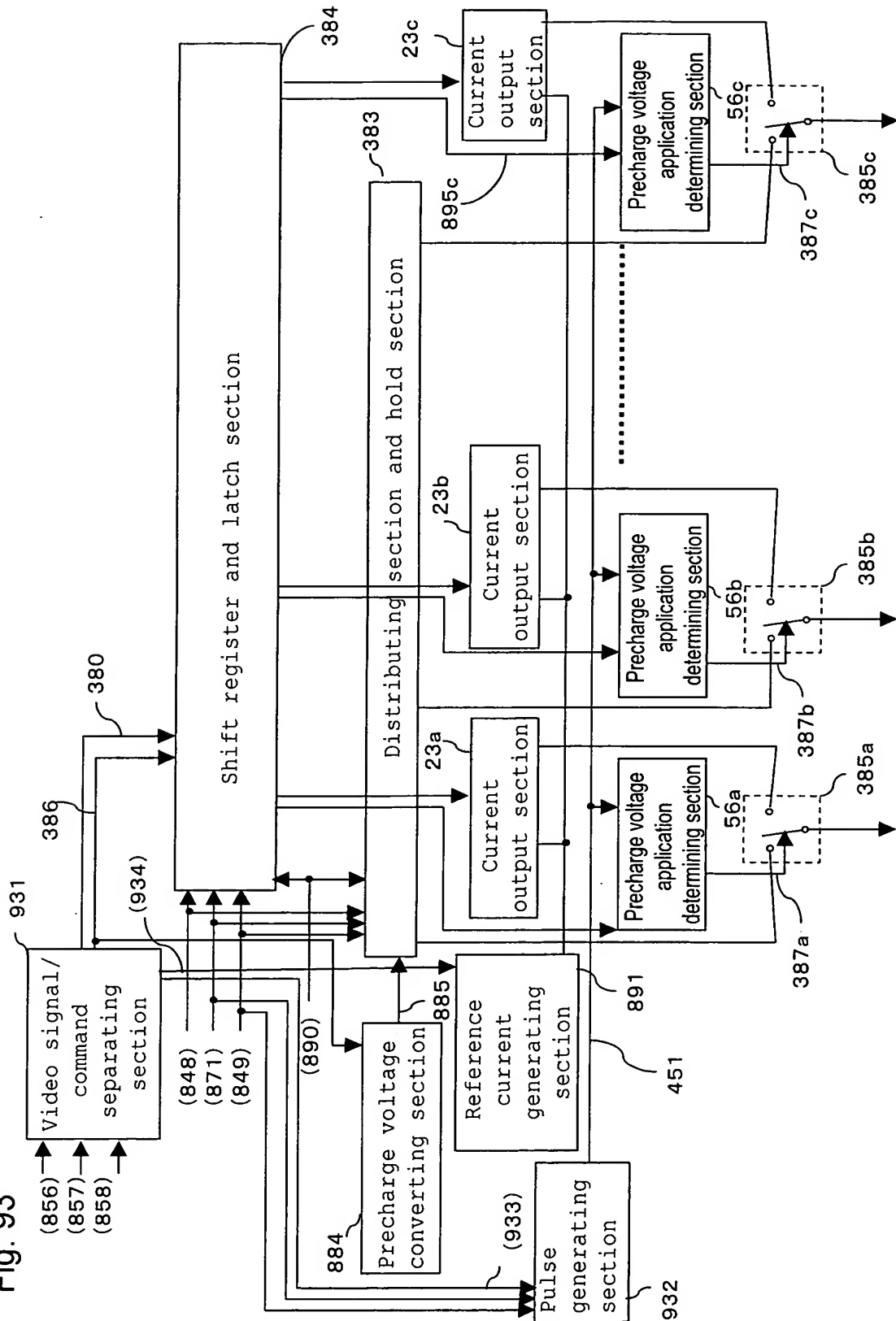


Fig. 93



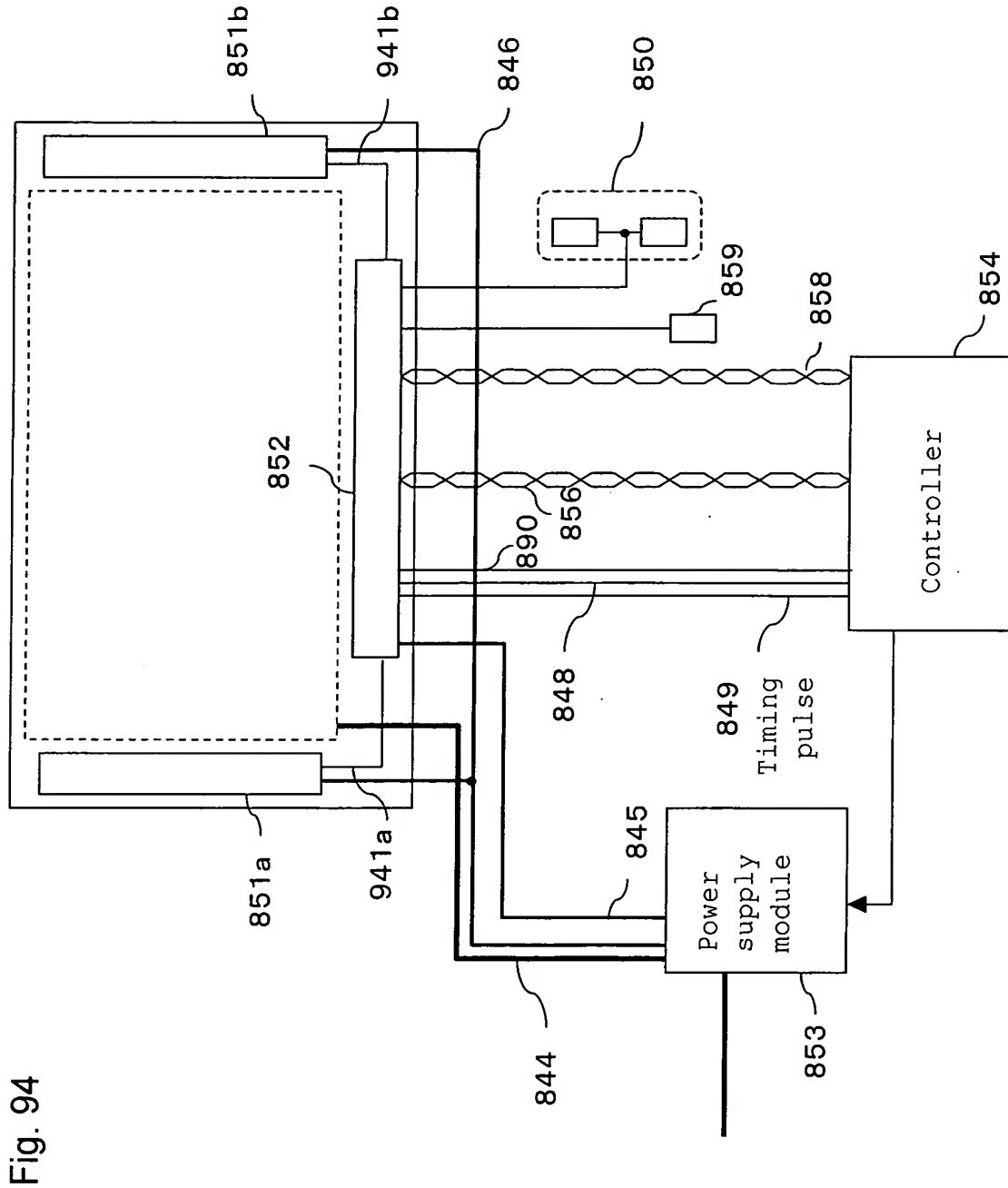


Fig. 95 (a)

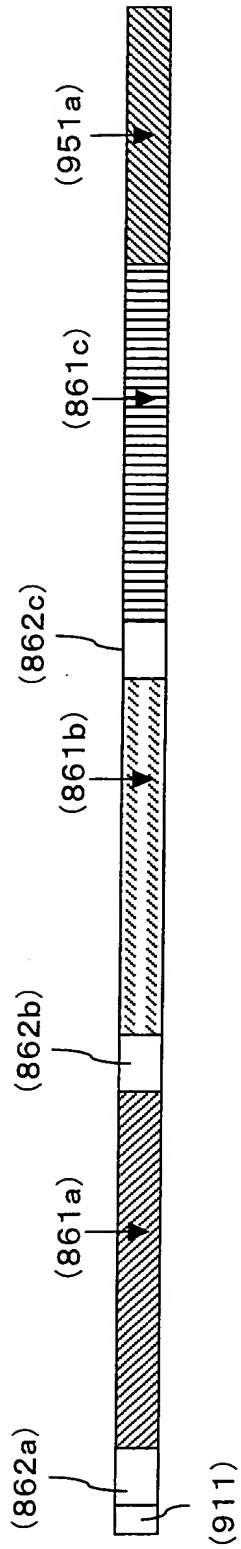


Fig. 95 (b)

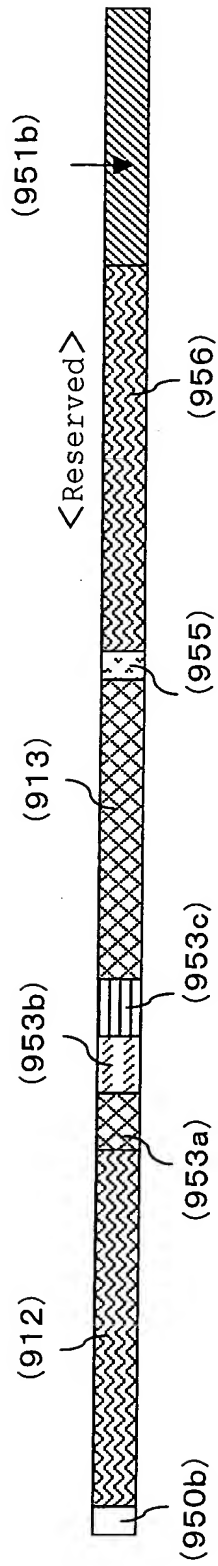
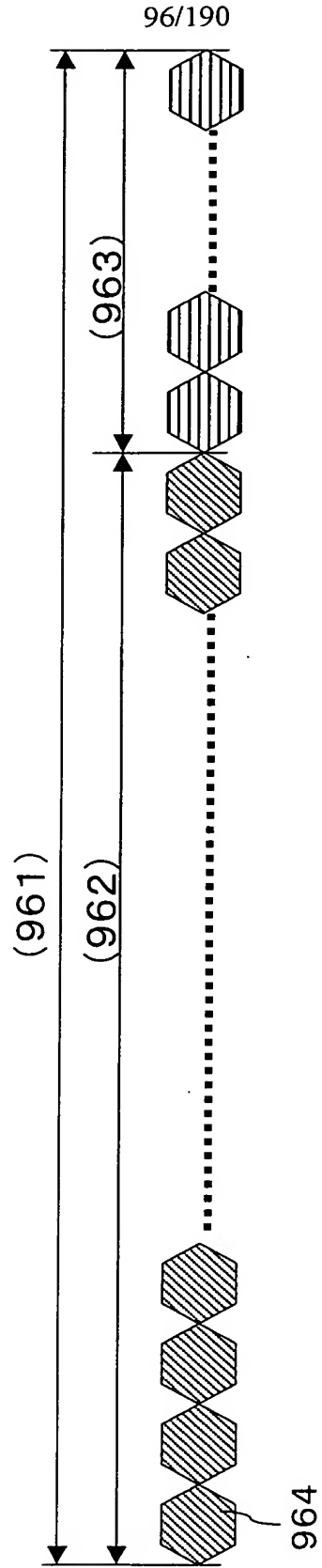


Fig. 96



97/190

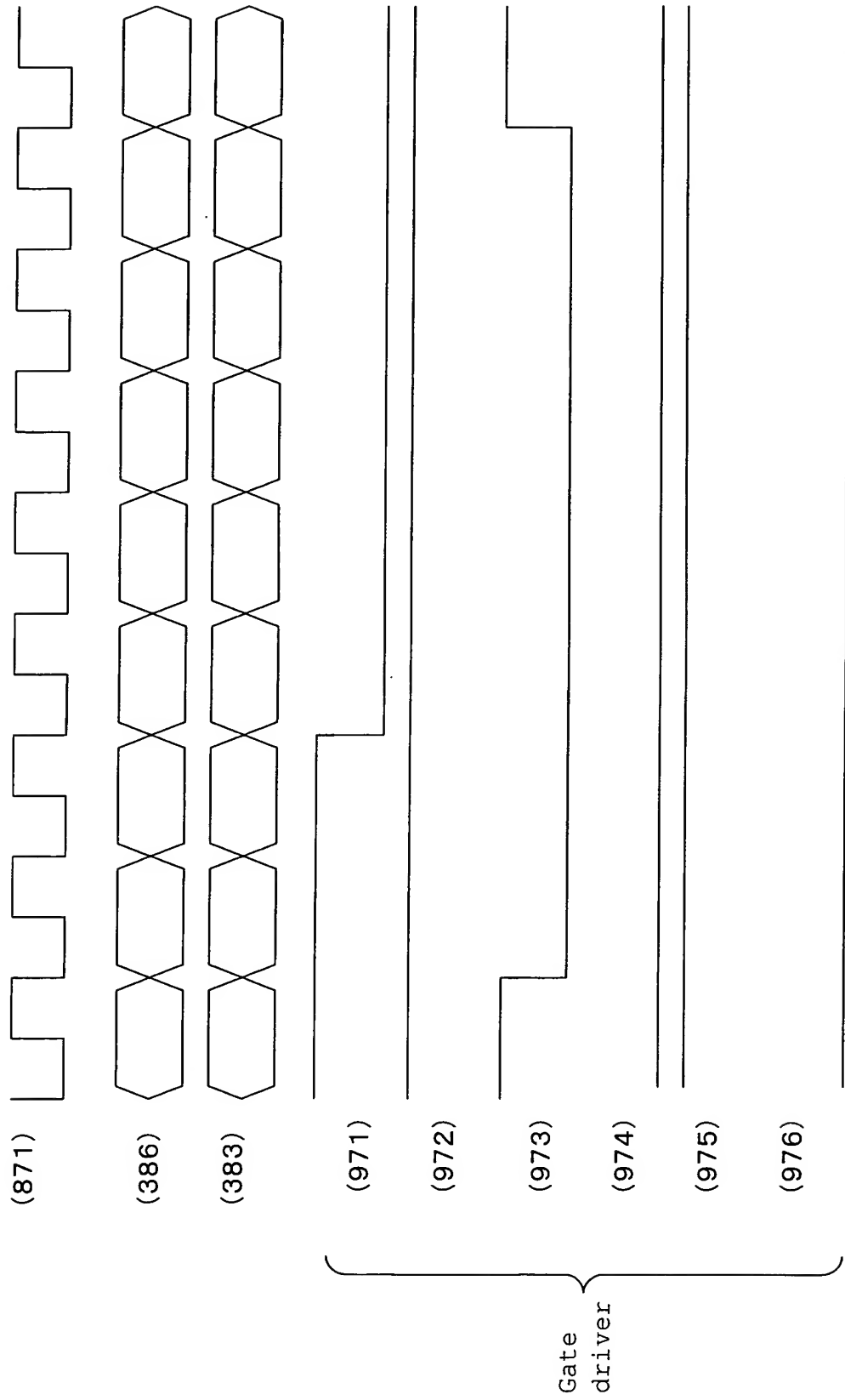
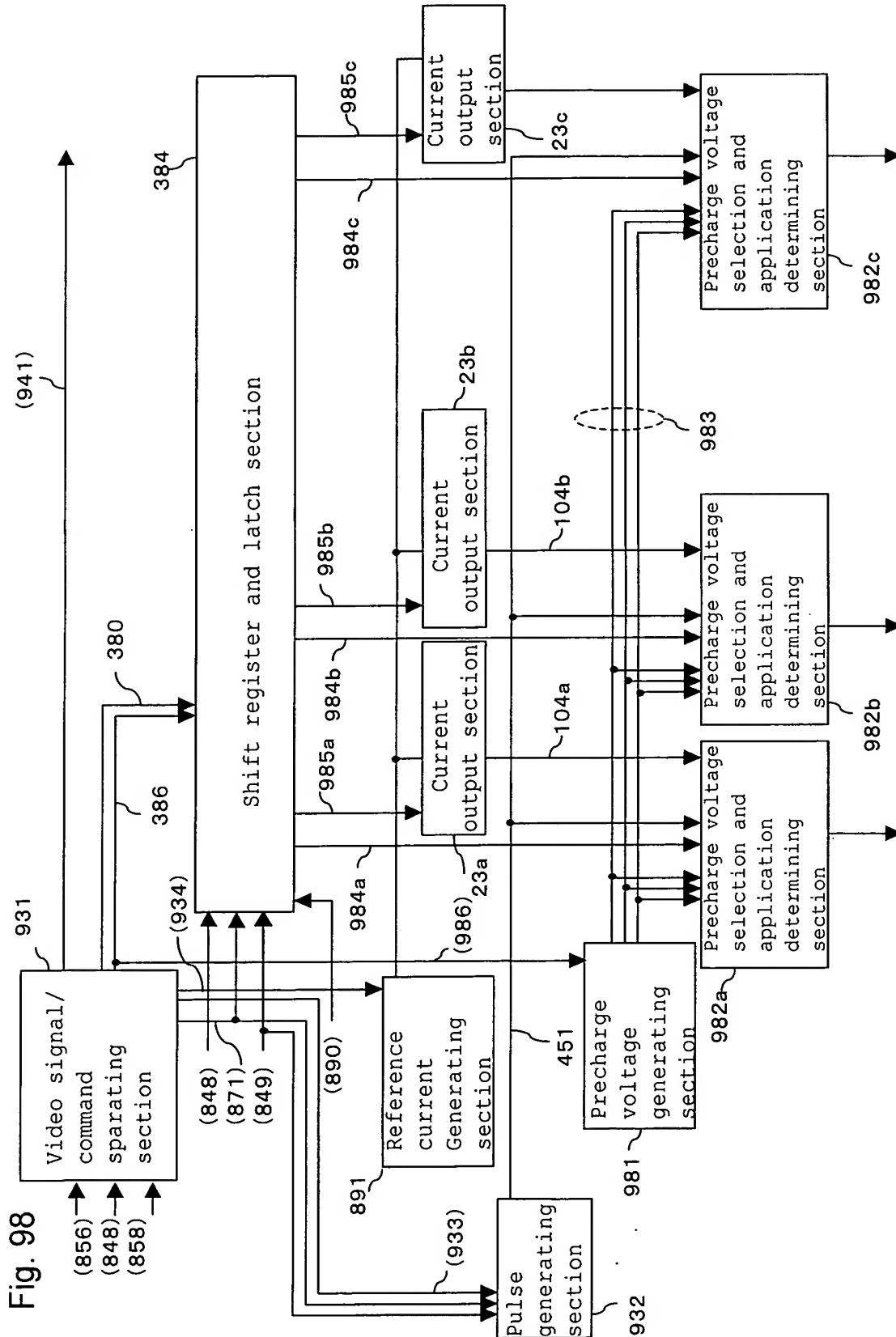


Fig. 97

98/190



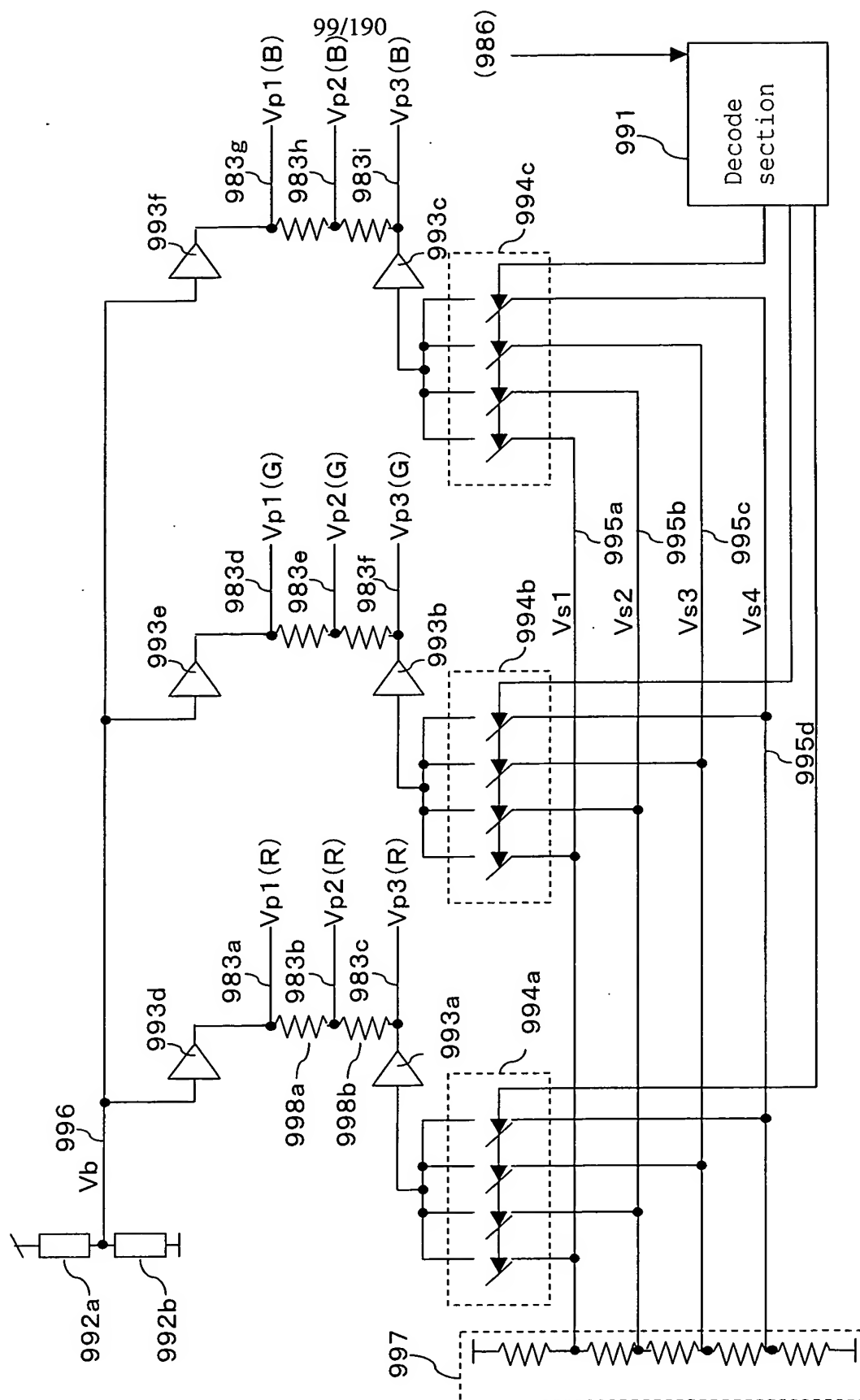
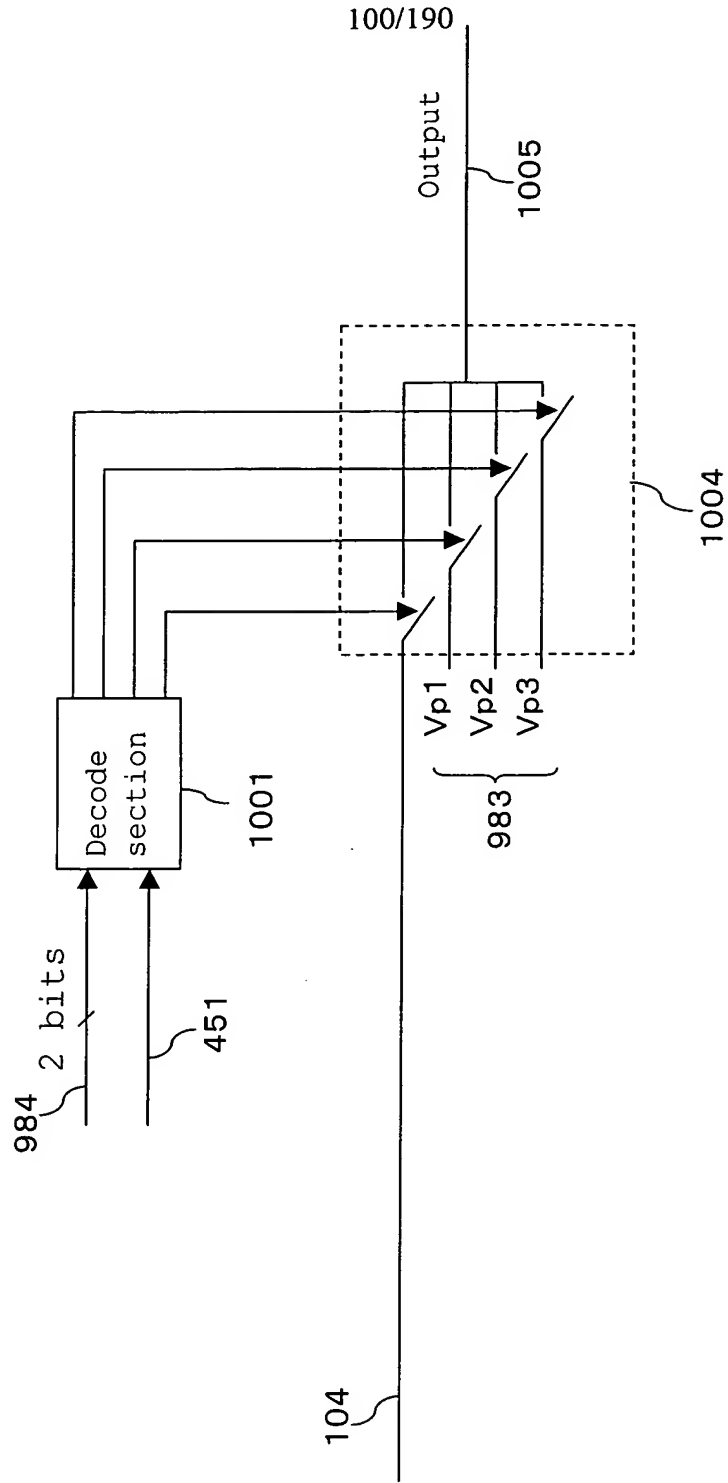


Fig. 100

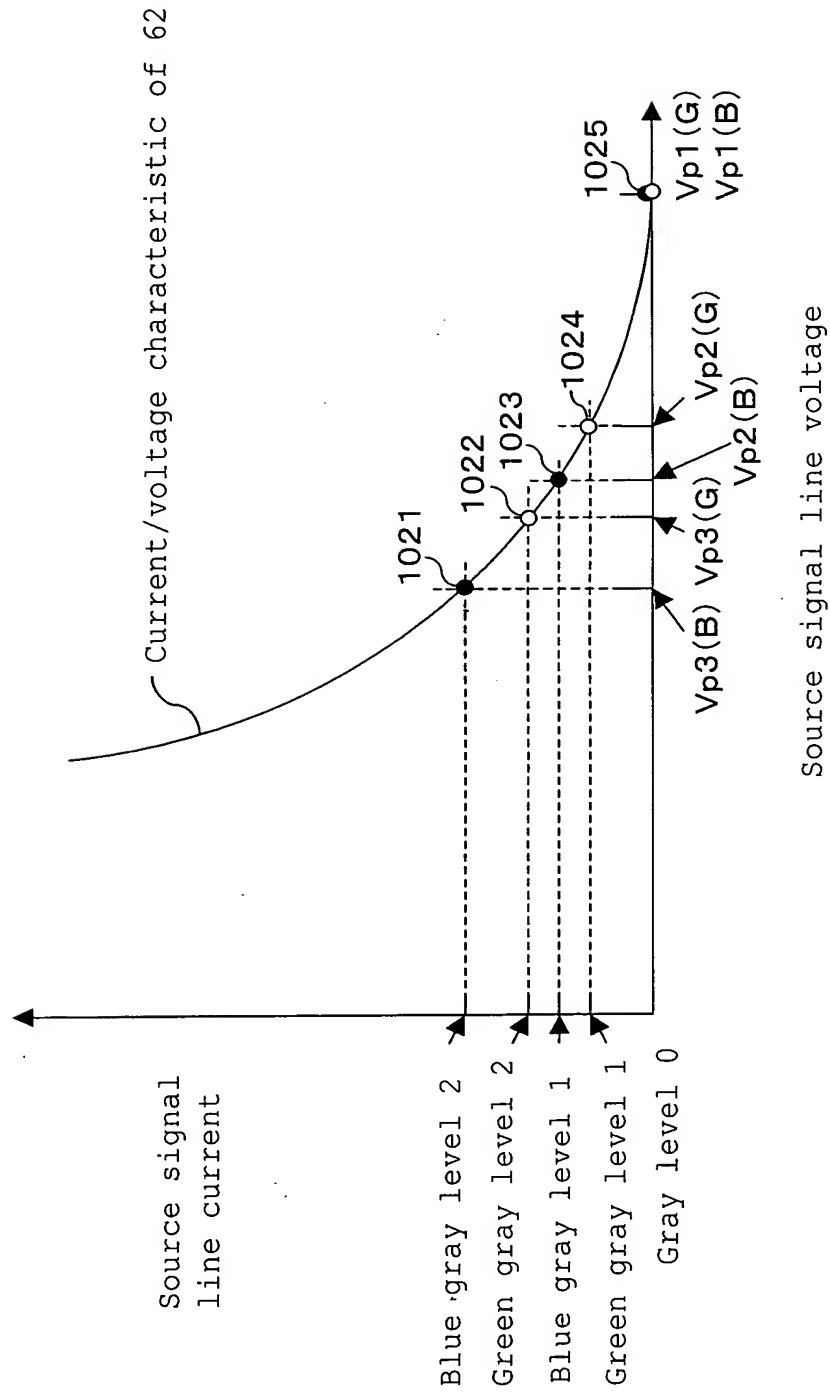


101/190

Fig. 101

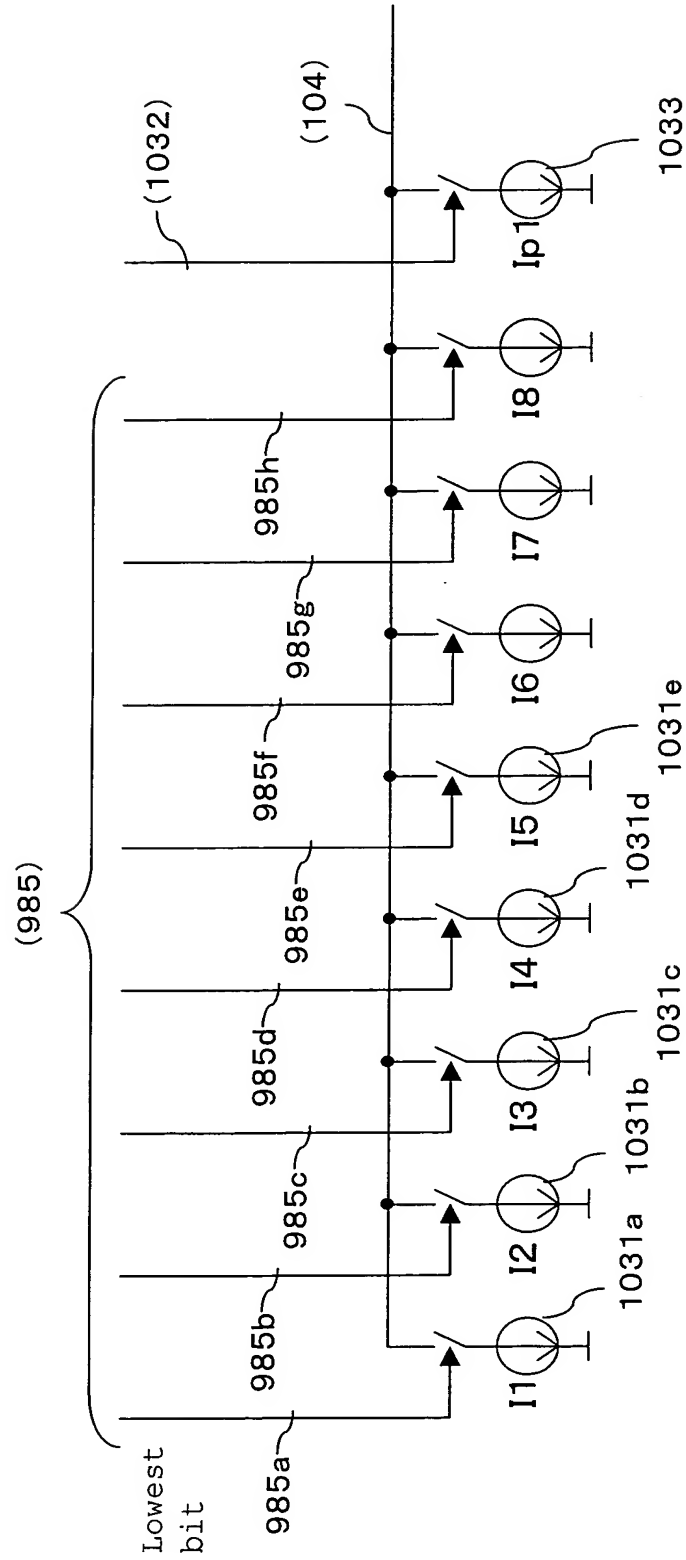
Precharge pulse(451)	Precharge determination line (984)	Output(1005)
0	0	Gray level current (104)
1	0	Gray level current (104)
0	1	Gray level current (104)
1	1	Vp1
0	2	Gray level current (104)
1	2	Vp2
0	3	Gray level current (104)
1	3	Vp3

Fig. 102



103/190

Fig. 103



104/190

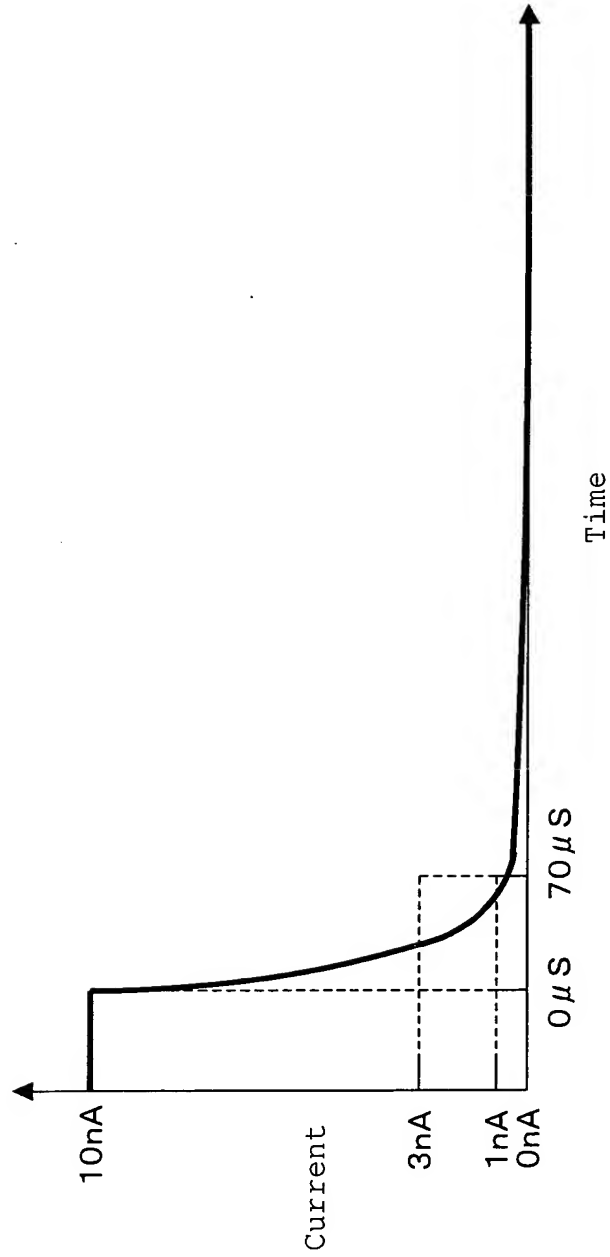


Fig. 104

105/190

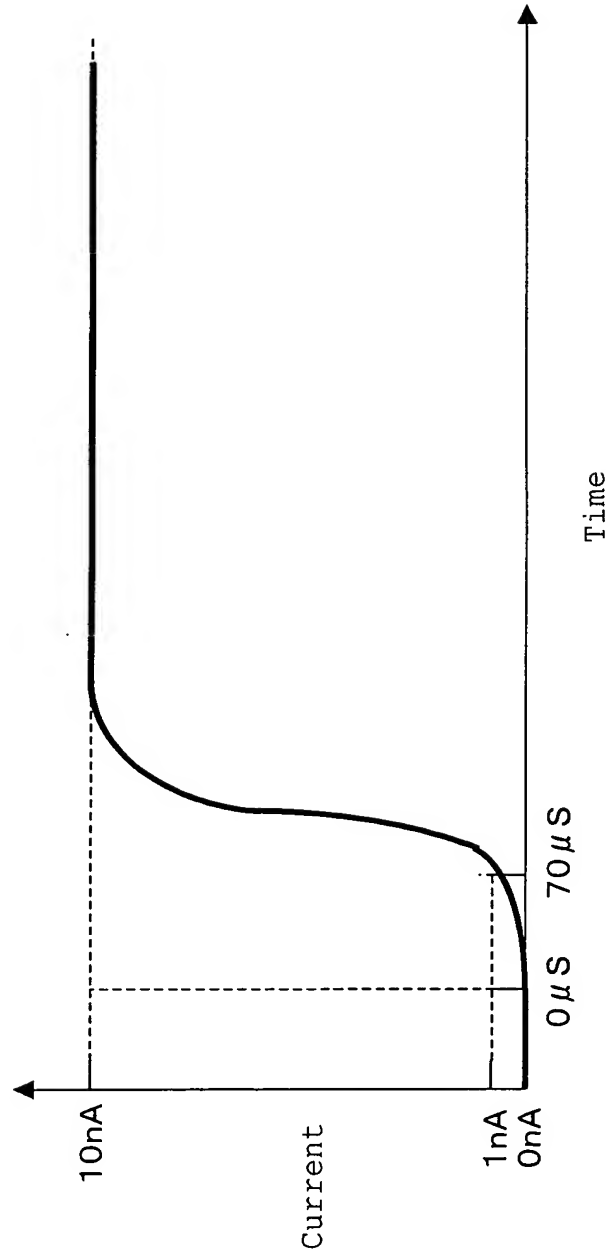
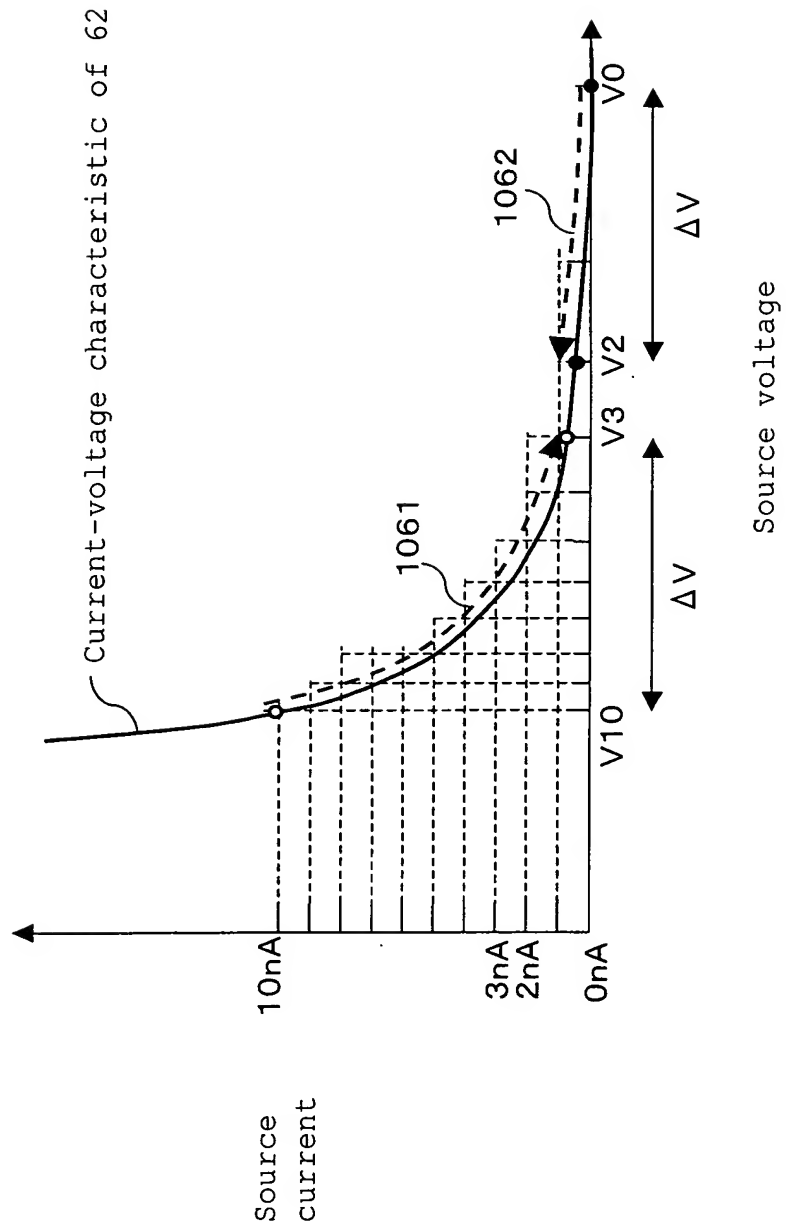


Fig. 105

106/190

Fig. 106



107/190

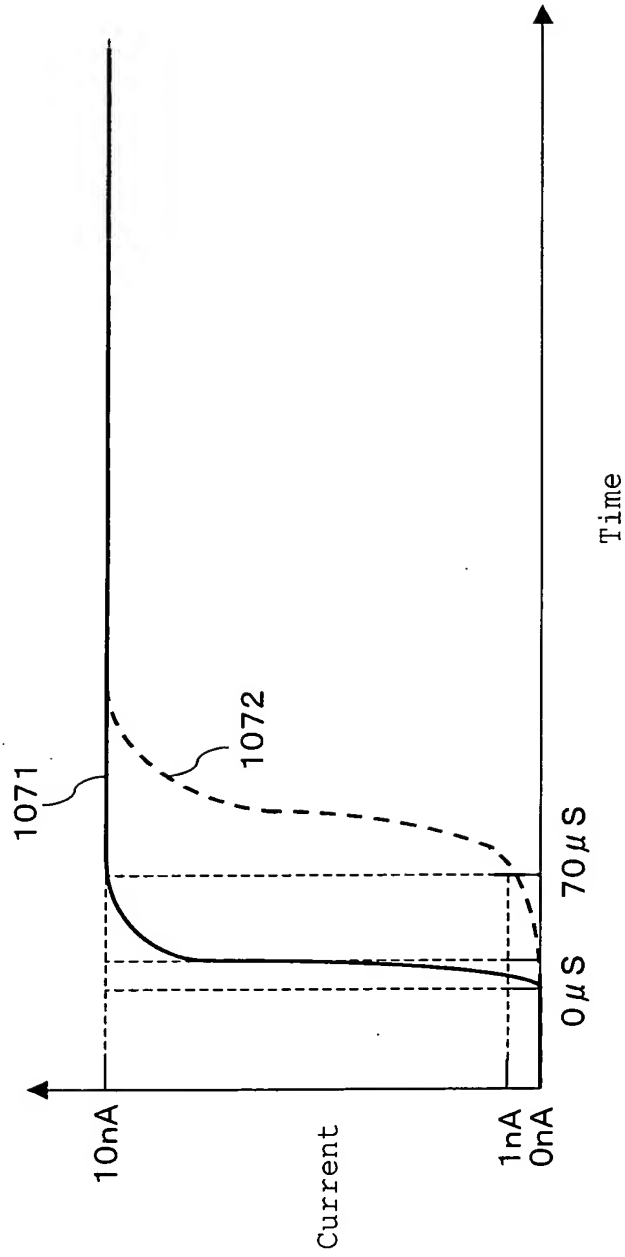


Fig. 107

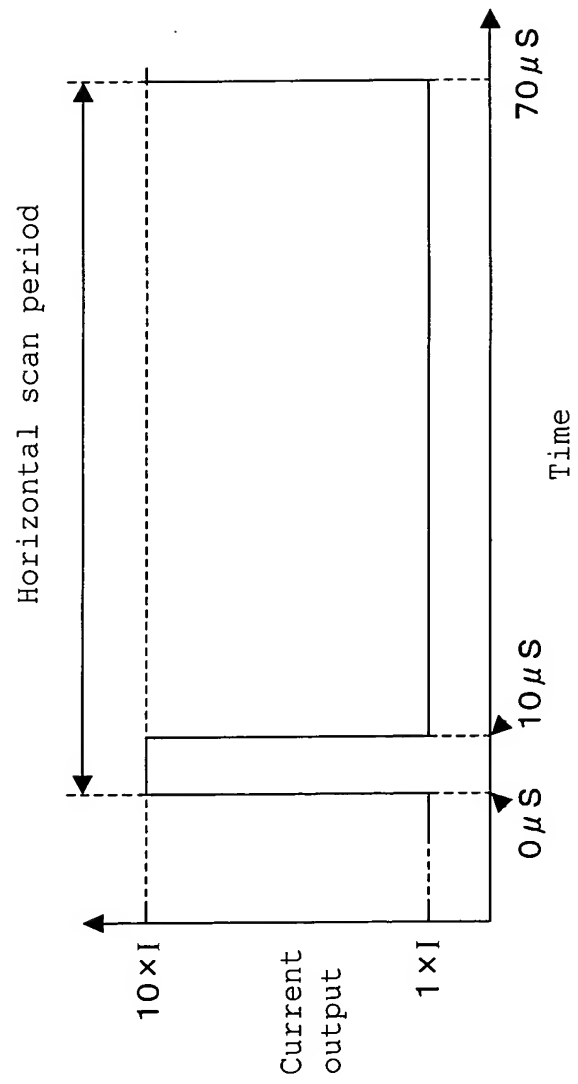
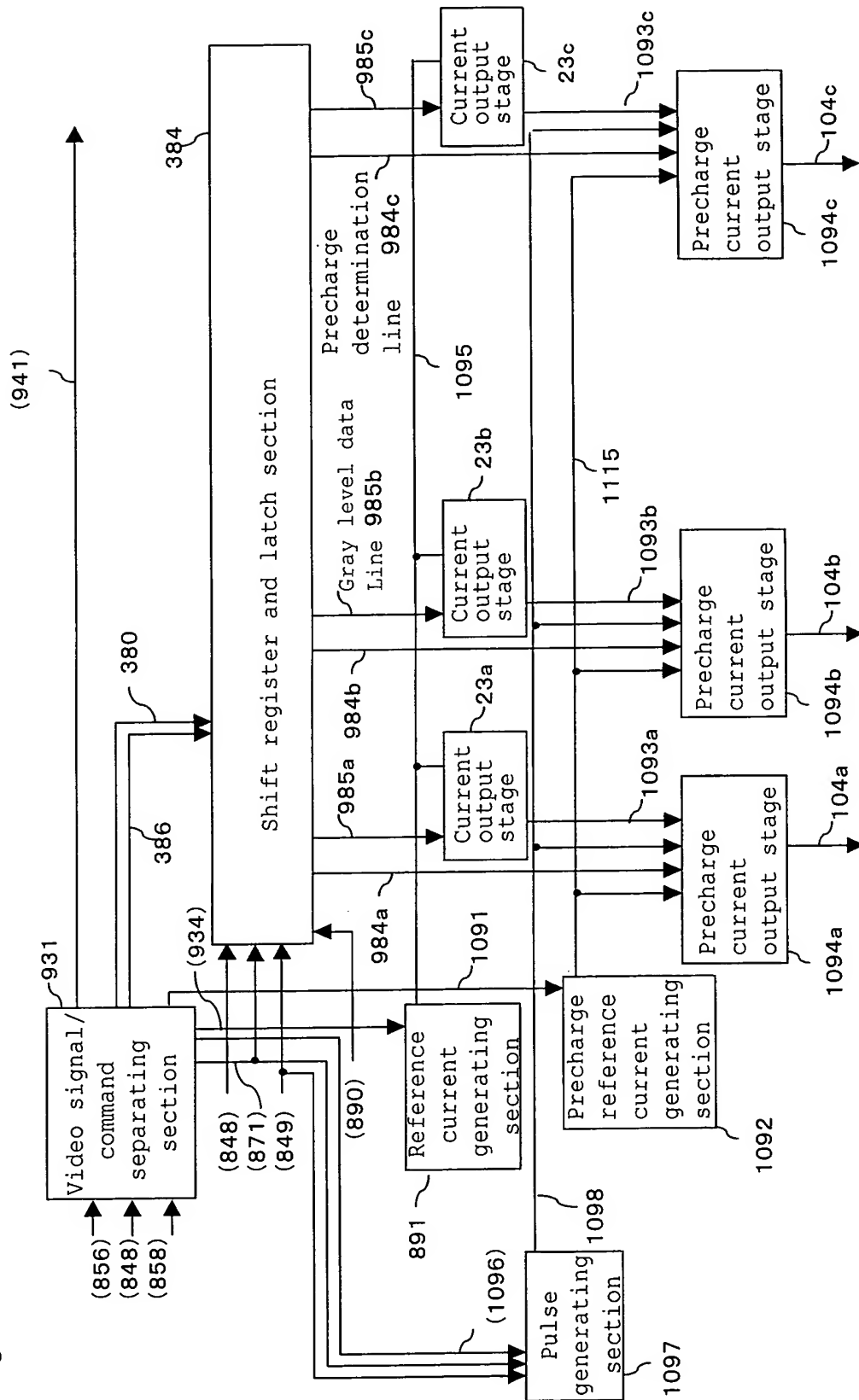


Fig. 108

109/190

Fig. 109



110/190

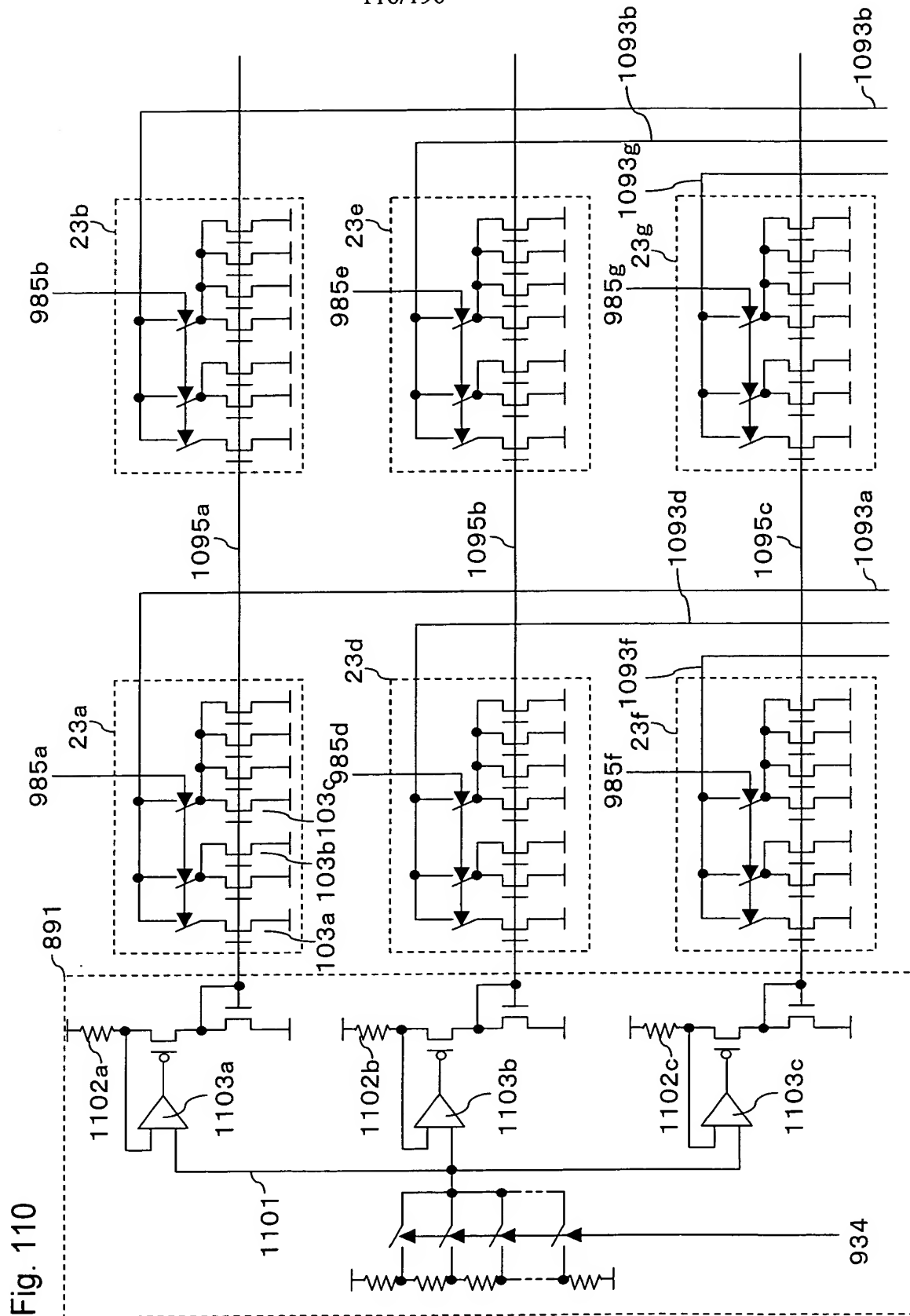
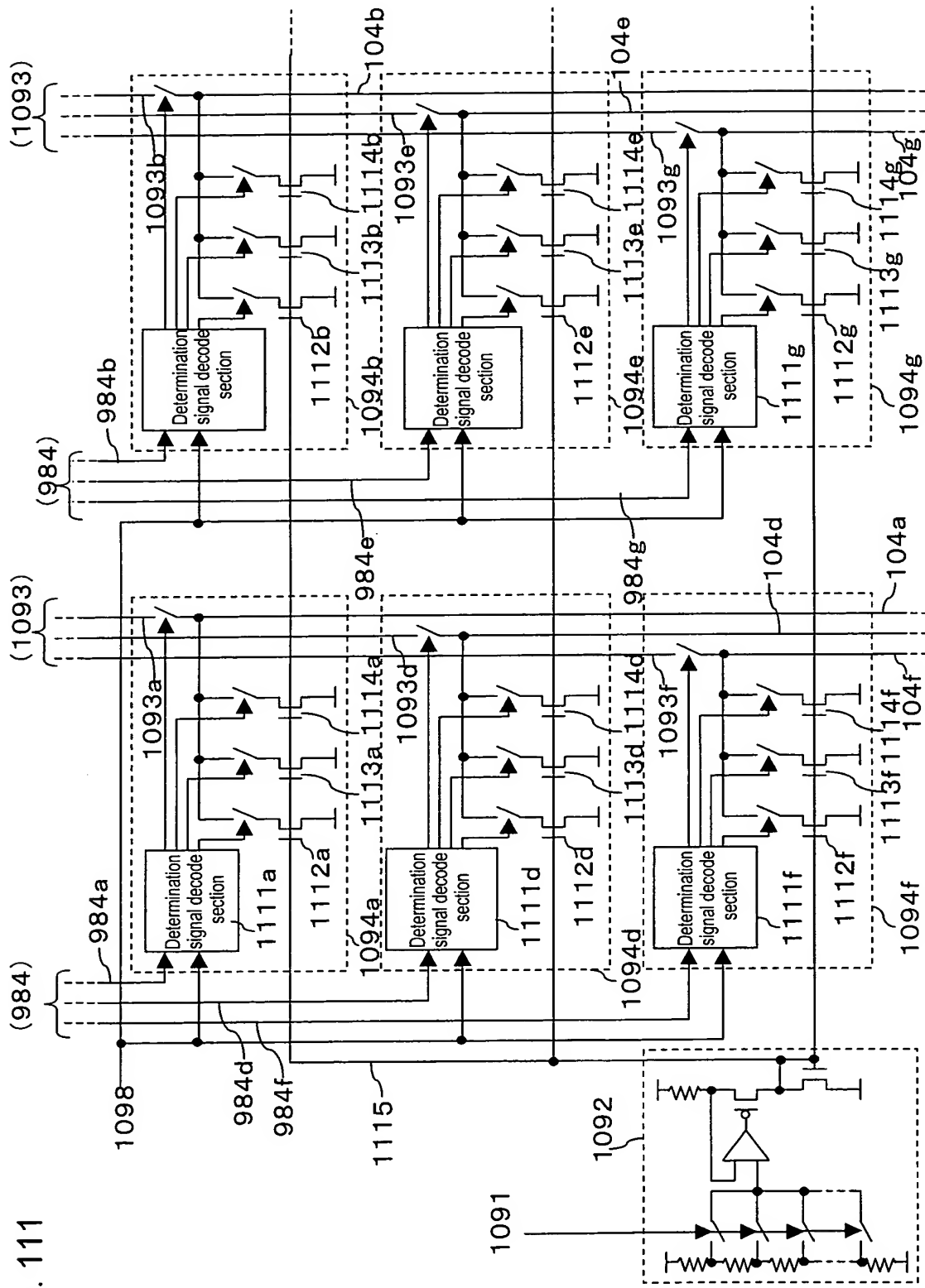


Fig. 111



112/190

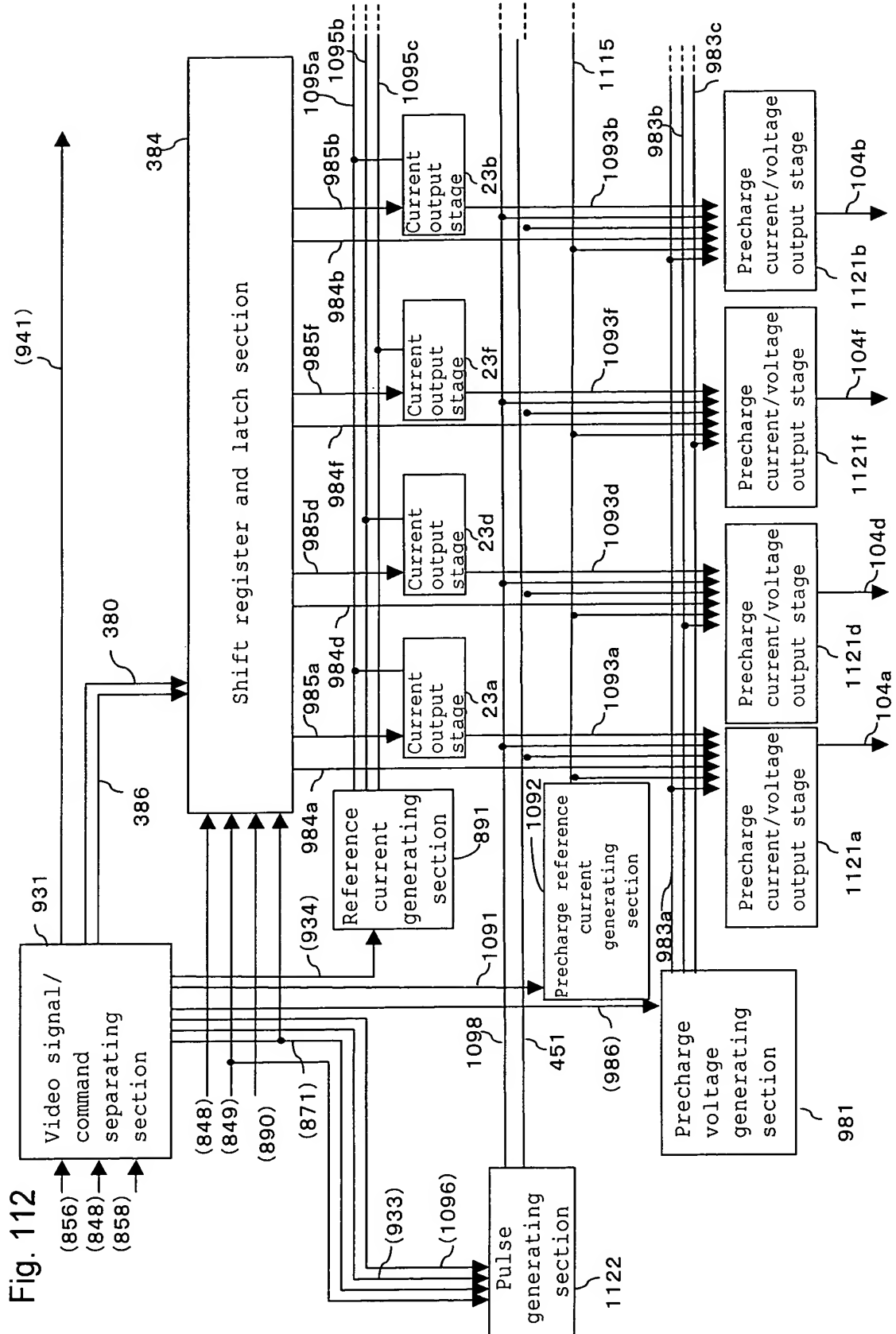


FIG. 1 is a block diagram of a signal processing system. The system includes a block labeled 1131, which contains a "Determination signal decode section". This section receives three inputs: 984 (labeled with a circled 2), 1098, and 451. The output of the "Determination signal decode section" is a signal line 1115, which is shown as a dashed line. This line branches into three paths, each passing through a switch (represented by a rectangle with a diagonal line) before entering a corresponding input of a block labeled 1112. The switches are labeled 1132, 1133, and 1134. The output of block 1112 is a signal line 104, which passes through a switch labeled 1135 before reaching the output terminal 983. A feedback path labeled 1093 connects the output terminal 983 back to the input 984.

114/190

Fig. 114

984		451	1098	1132	1133	1134	1135	State
Upper bit	Lower bit							
0	0	X	X	OFF	OFF	ON	OFF	No precharge for current or voltage
0	1	0	X	OFF	OFF	ON	OFF	Voltage precharge
		1	X	OFF	OFF	OFF	ON	
1	0	X	0	OFF	OFF	ON	OFF	Current precharge (current source 1112)
		X	1	ON	OFF	OFF	OFF	
1	1	X	0	OFF	OFF	ON	OFF	Current precharge (current source 1113)
		X	1	OFF	ON	OFF	OFF	

X indicates Don't care

115/190

Fig. 115

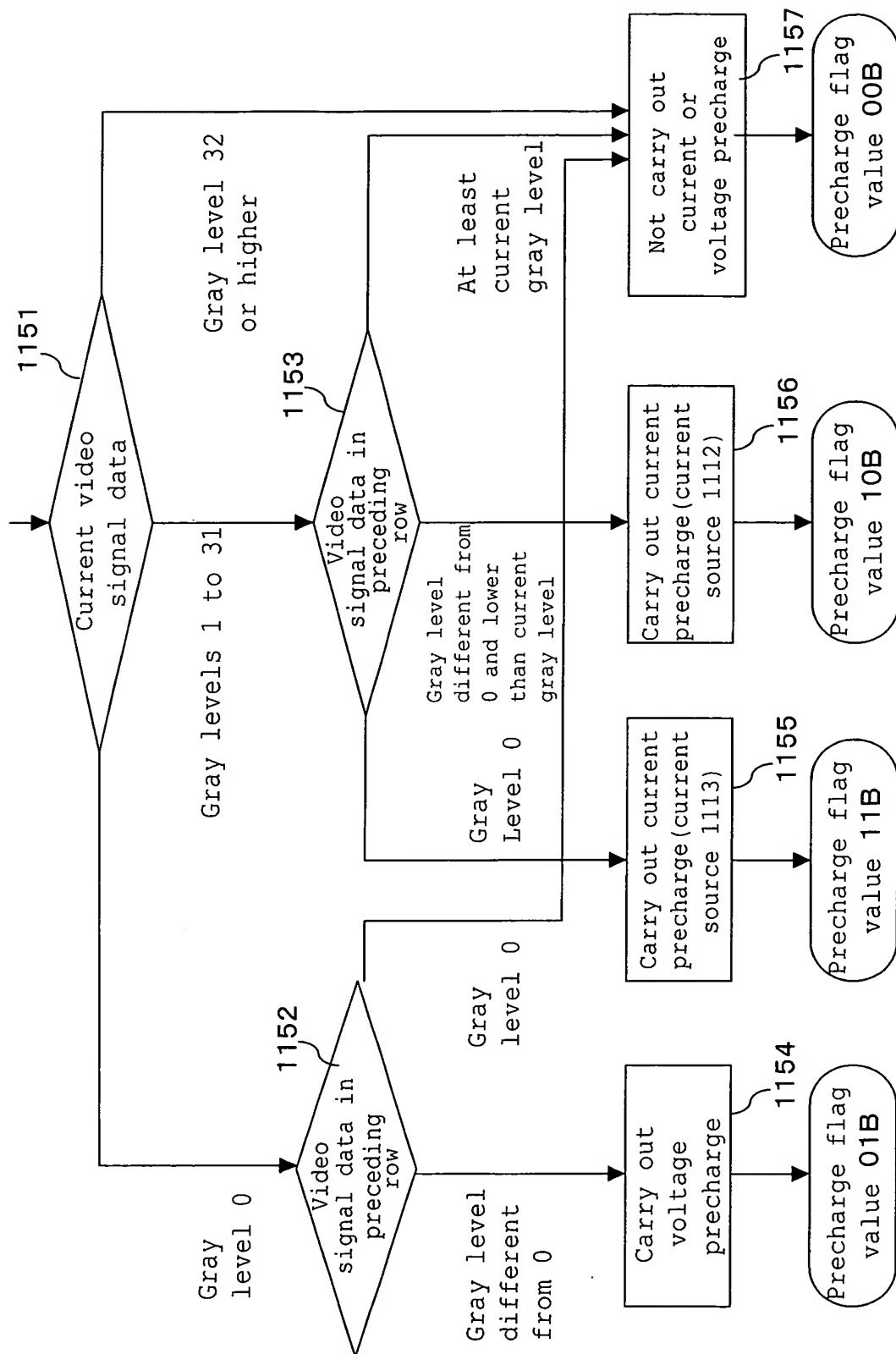
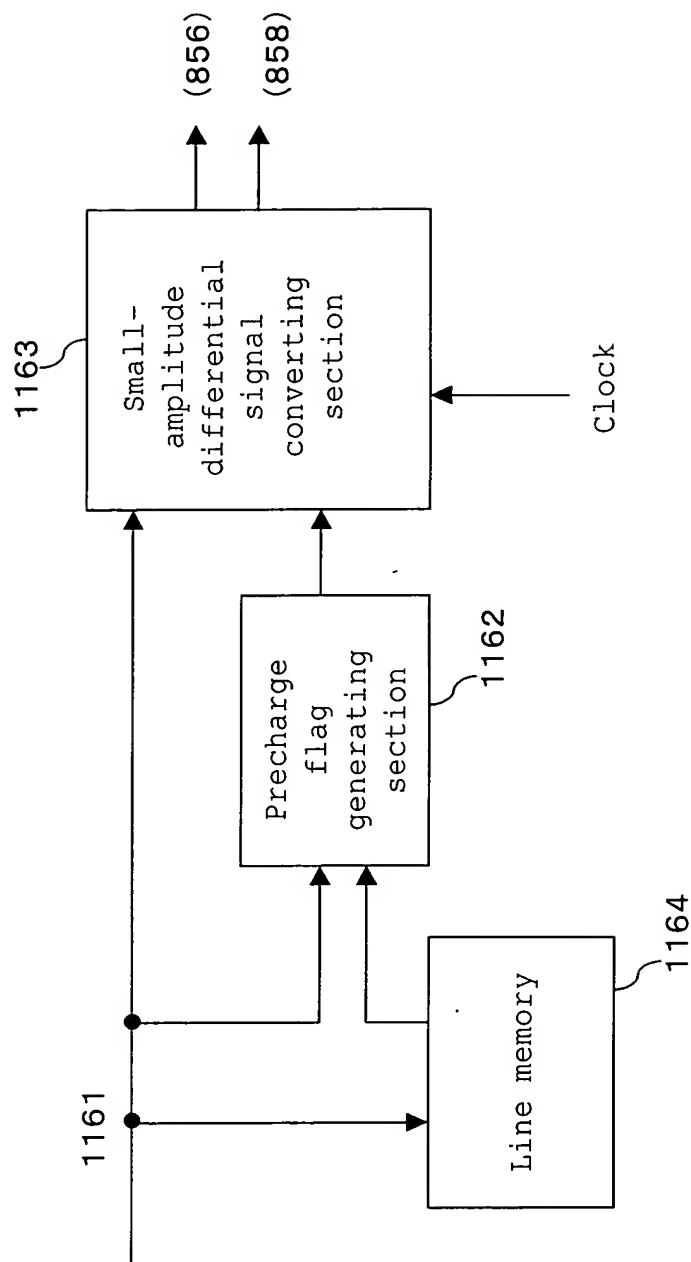


Fig. 116



117/190

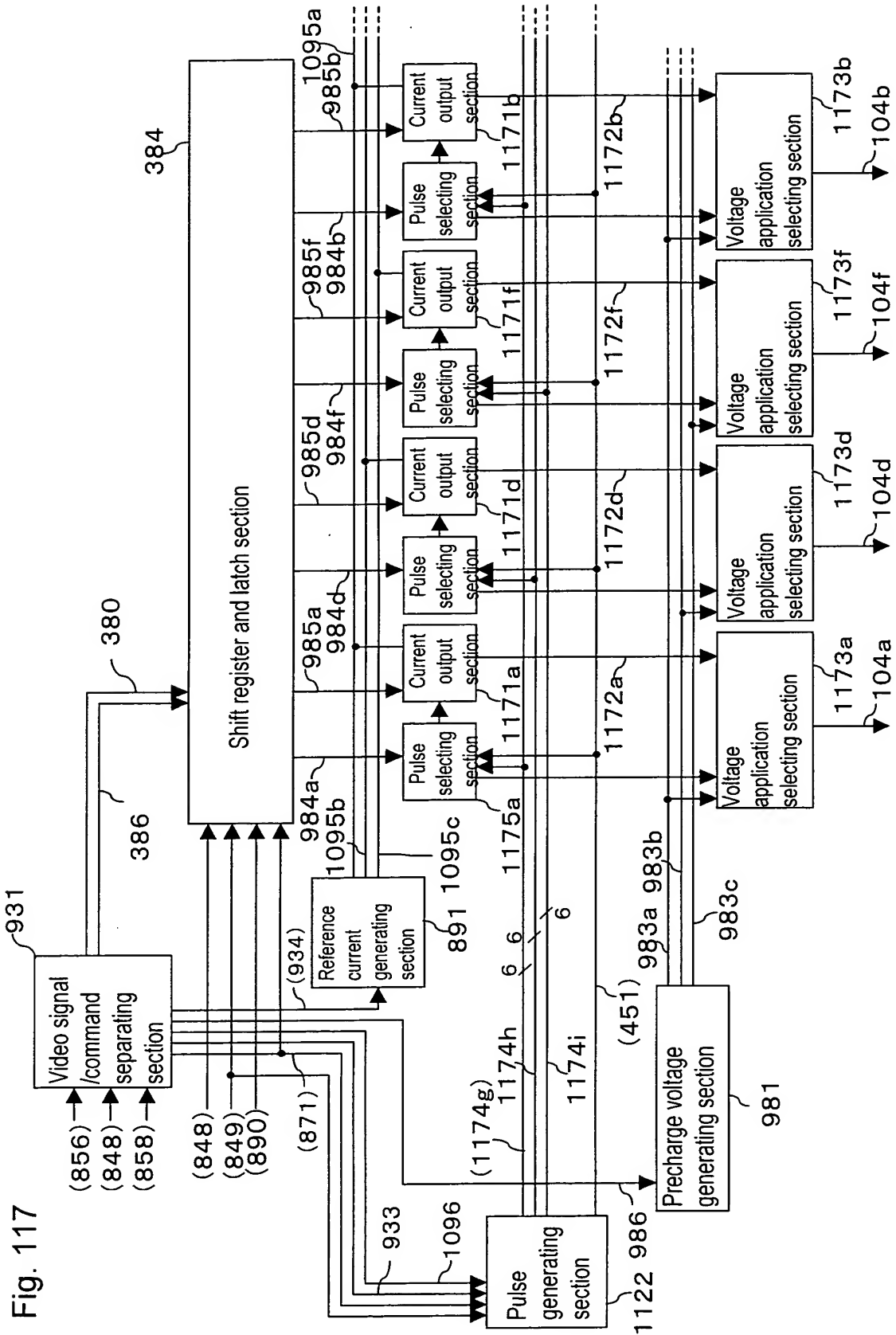
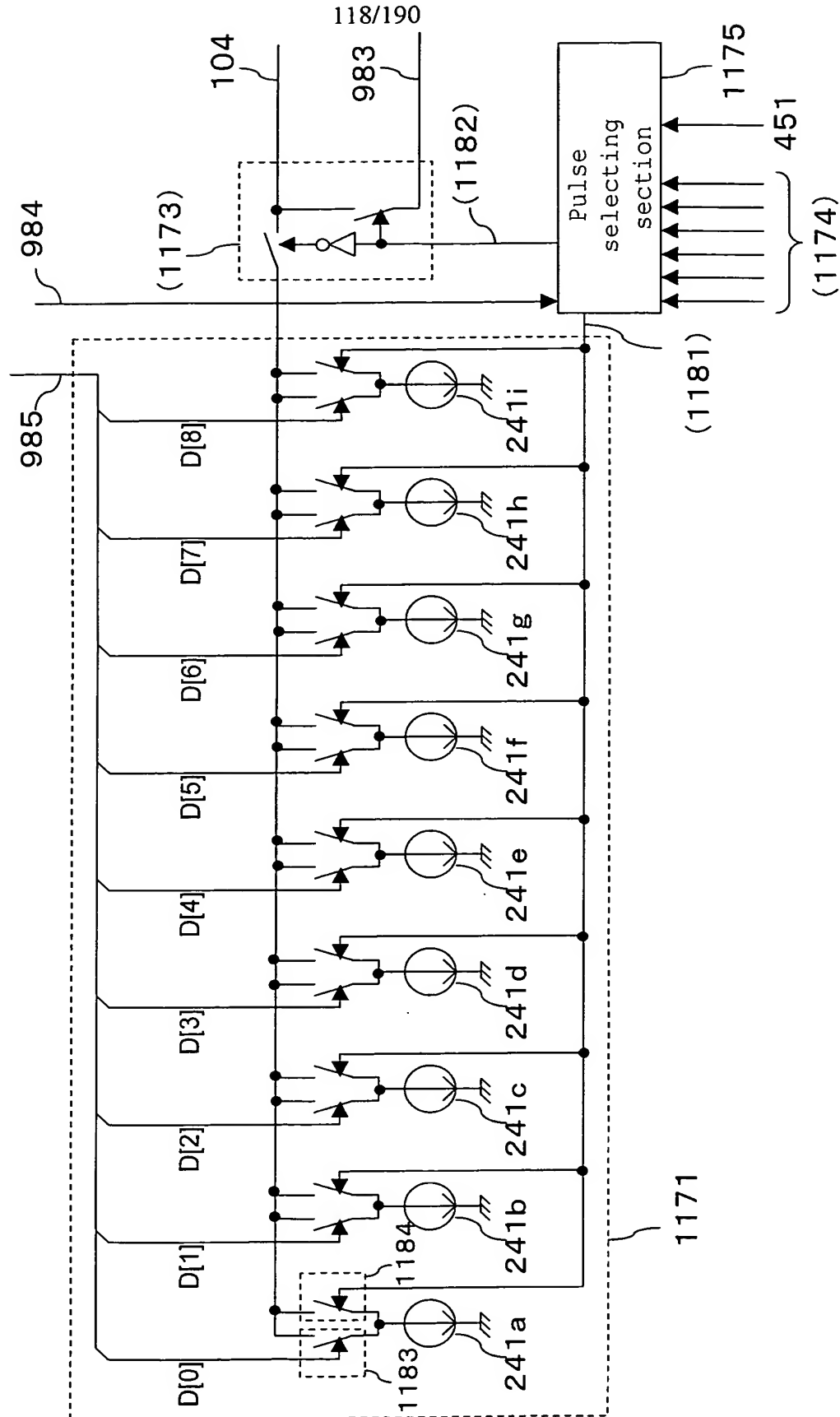


Fig. 118



119/190

Fig. 119

Precharge determination line(984)			Current precharge control line(1181)	Voltage precharge control line(1182)
Highest bit	Middle bit	Lowest bit		
0	0	0	Always at "L" level	Always at "L" level
0	0	1	Same as 1174a	Same as 451
0	1	0	Same as 1174b	Same as 451
0	1	1	Same as 1174c	Same as 451
1	0	0	Same as 1174d	Same as 451
1	0	1	Same as 1174e	Same as 451
1	1	0	Same as 1174f	Same as 451
1	1	1	Always at "L" level	Same as 451

Fig. 120

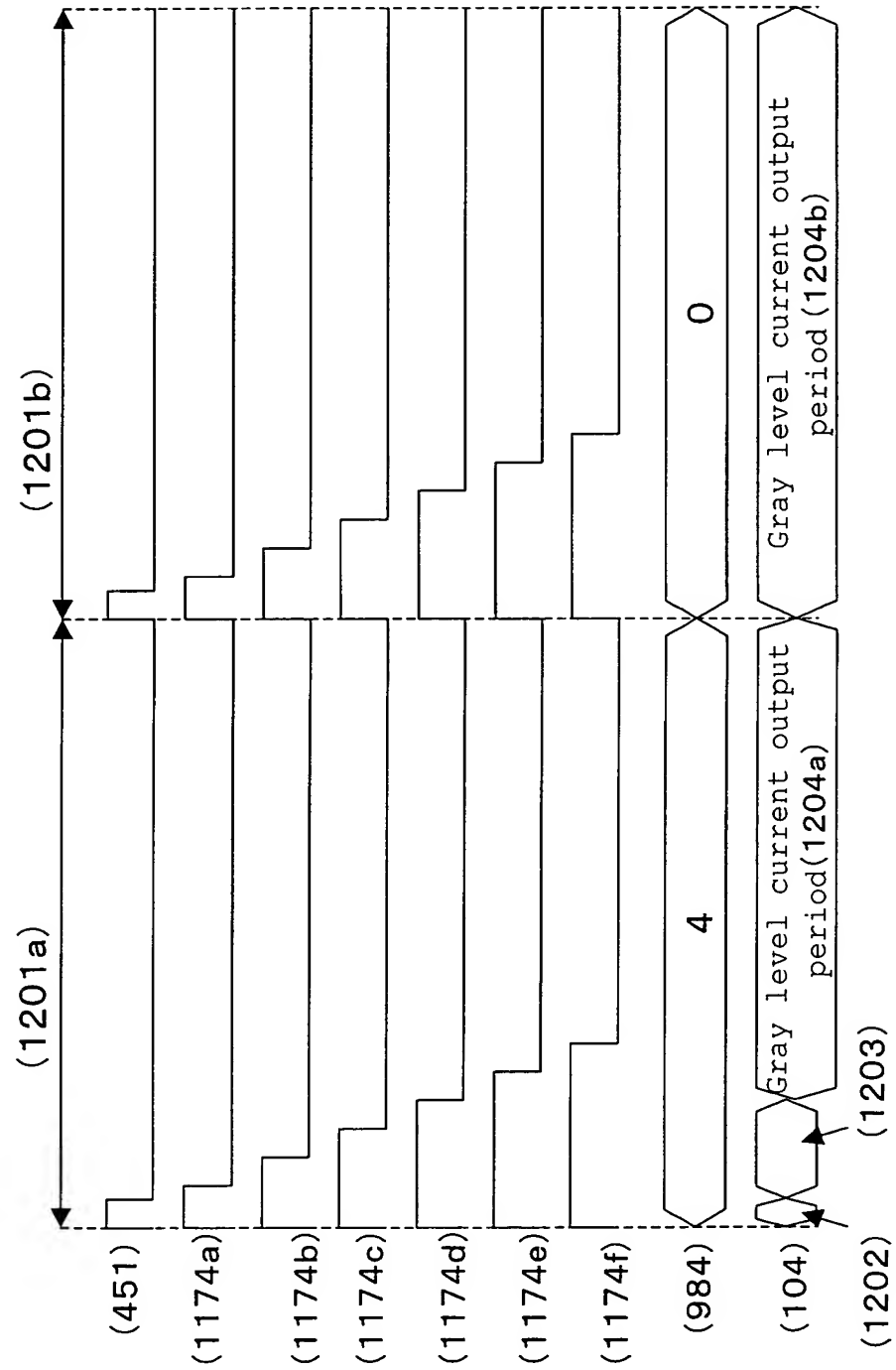


Fig. 121 (a)

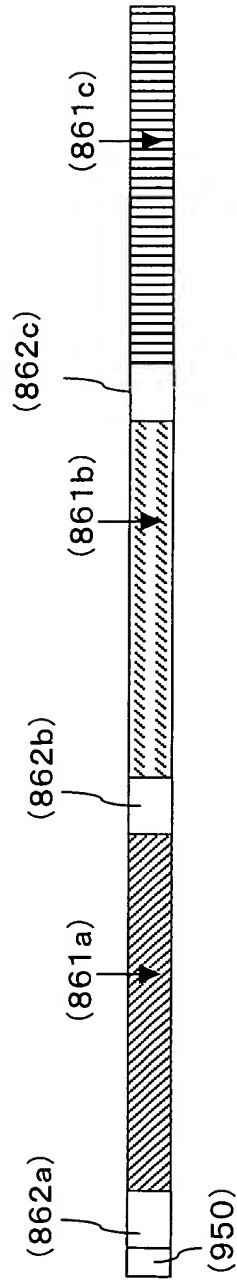


Fig. 121 (b)

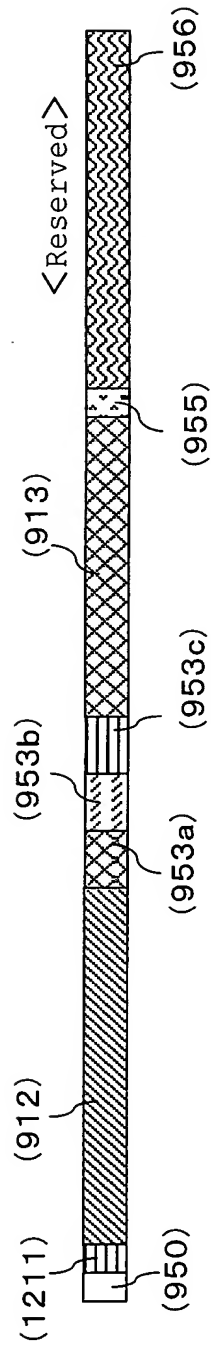
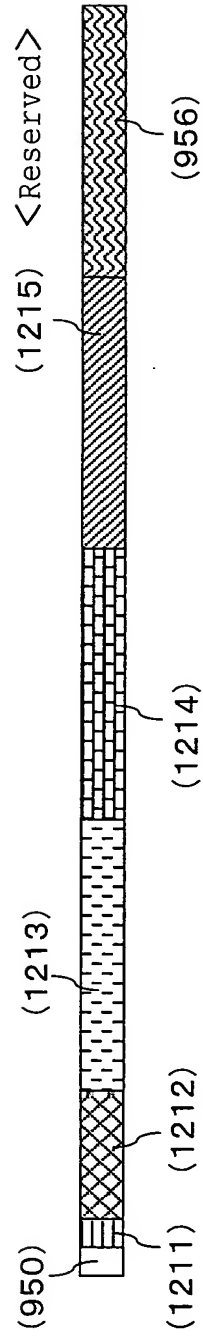


Fig. 121 (c)



122/190

Fig. 122

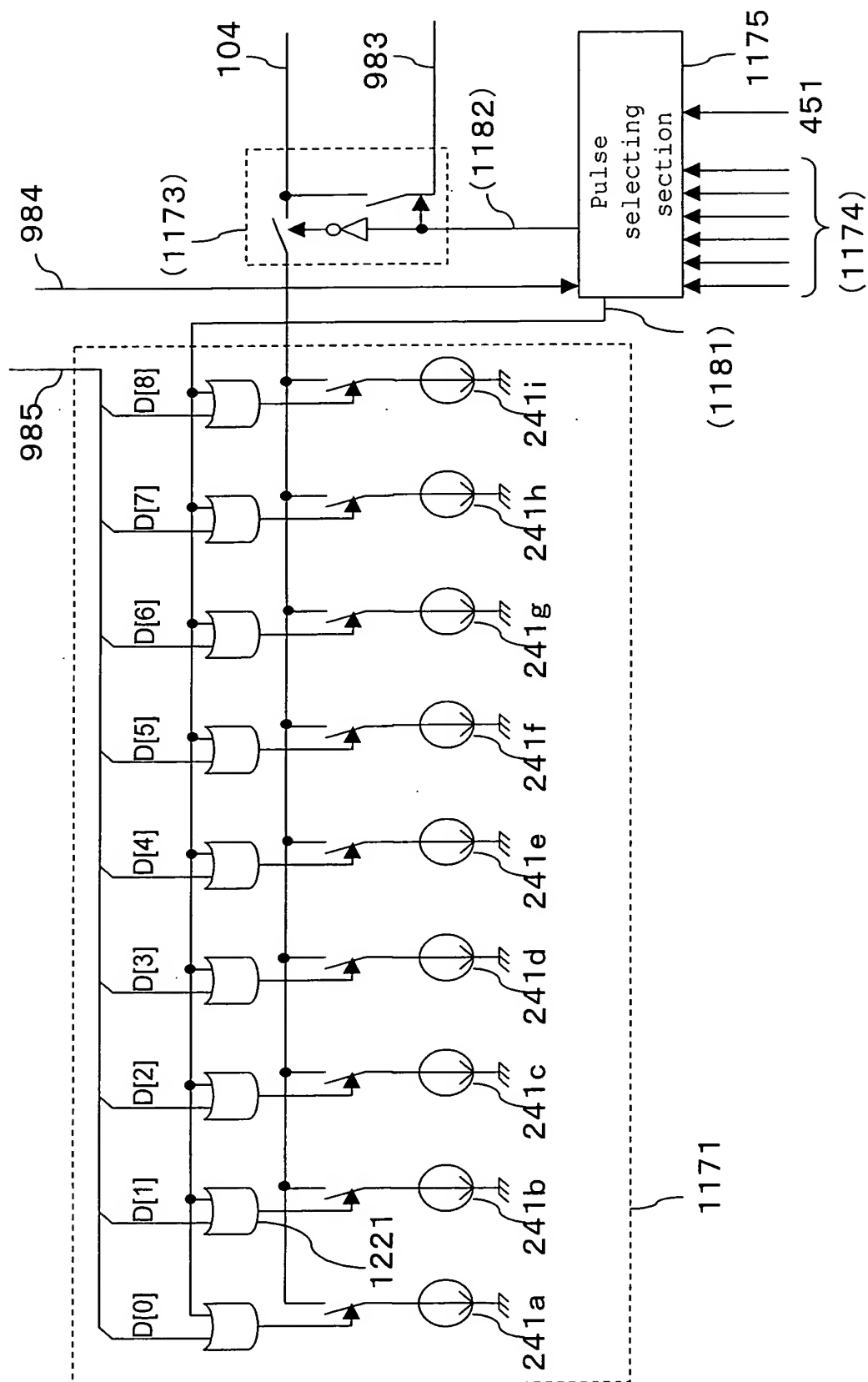
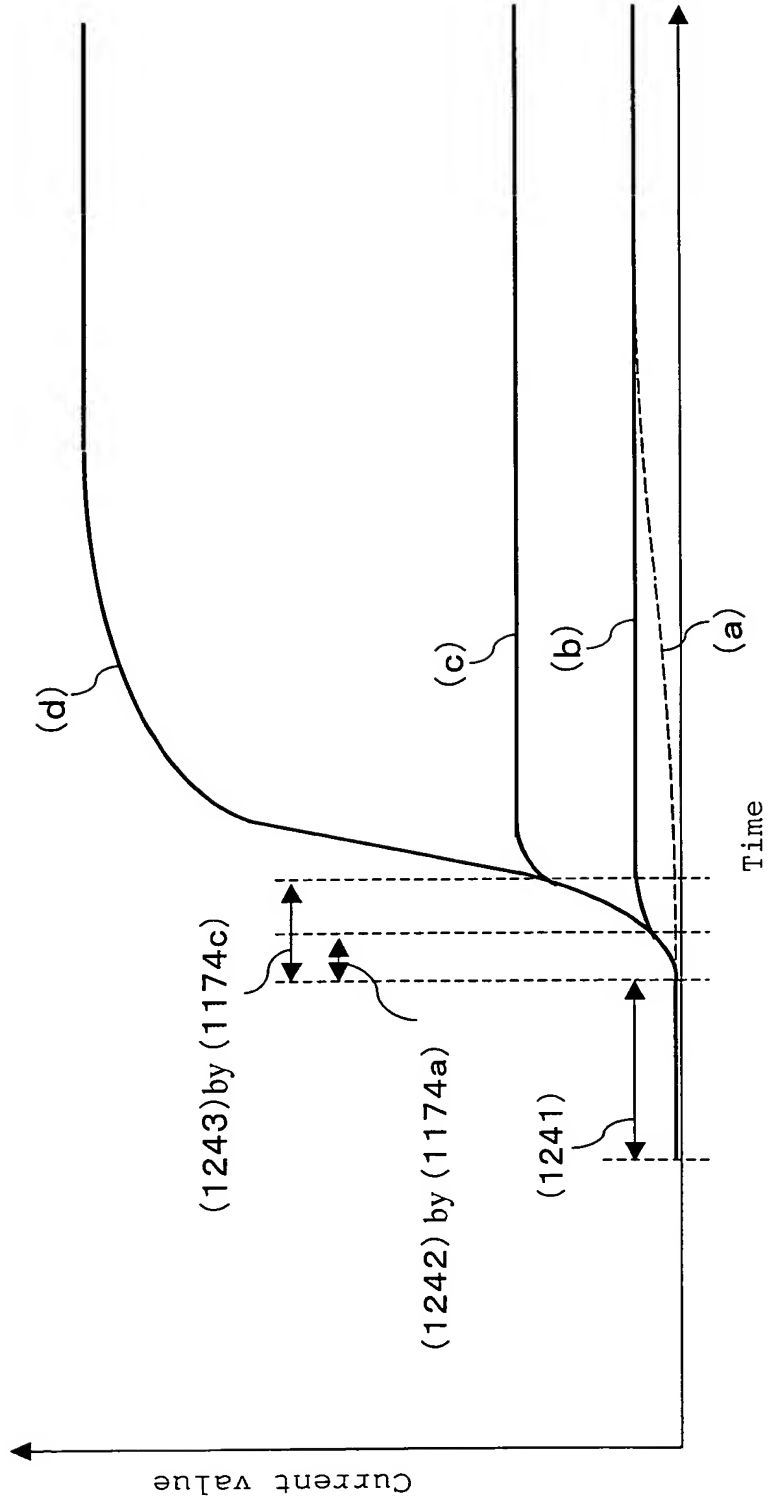


Fig. 123

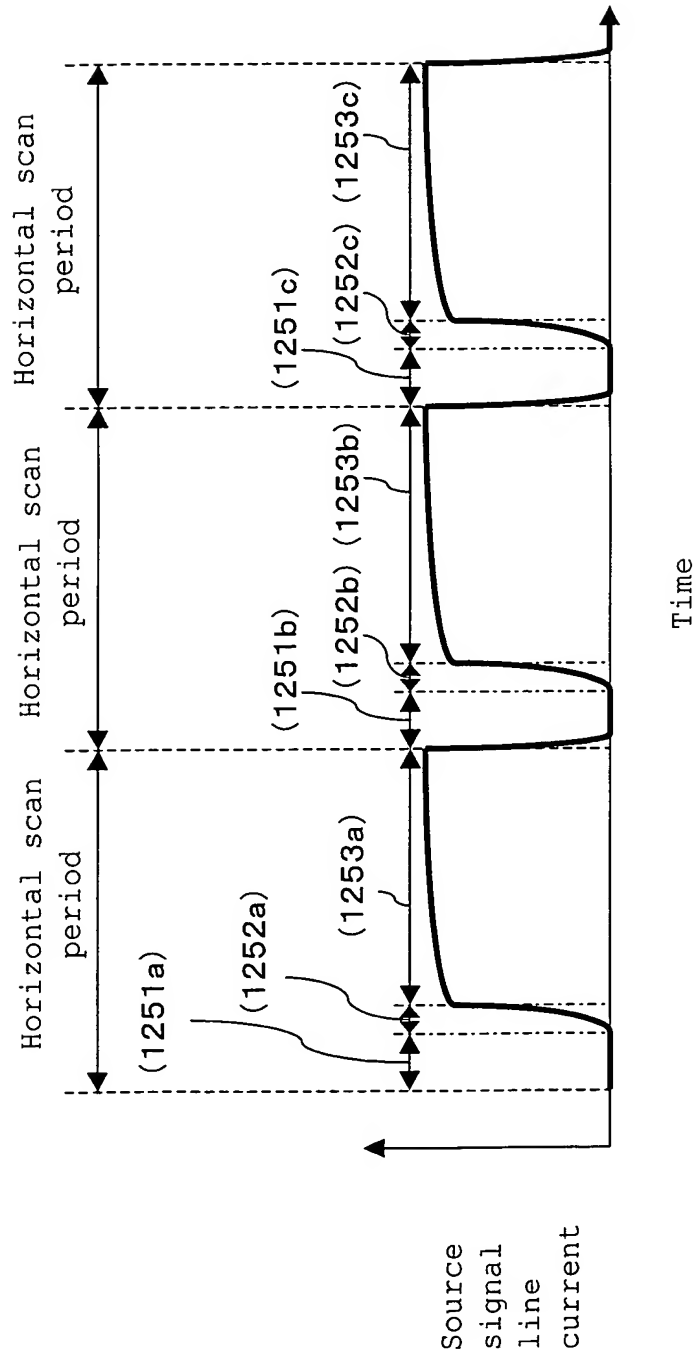
Gray level	Precharge current output period	Use of only current precharge pulse
0	None	None (only voltage precharge)
1	0.4 μ s	1174a
2	0.8 μ s	1174b
3	1.2 μ s	1174c
4	1.6 μ s	1174d
5	2.0 μ s	1174e
6~35	2.4 μ s	1174f
36~255	None	None

Fig. 124



125/190

Fig. 125



126/190

Fig. 126

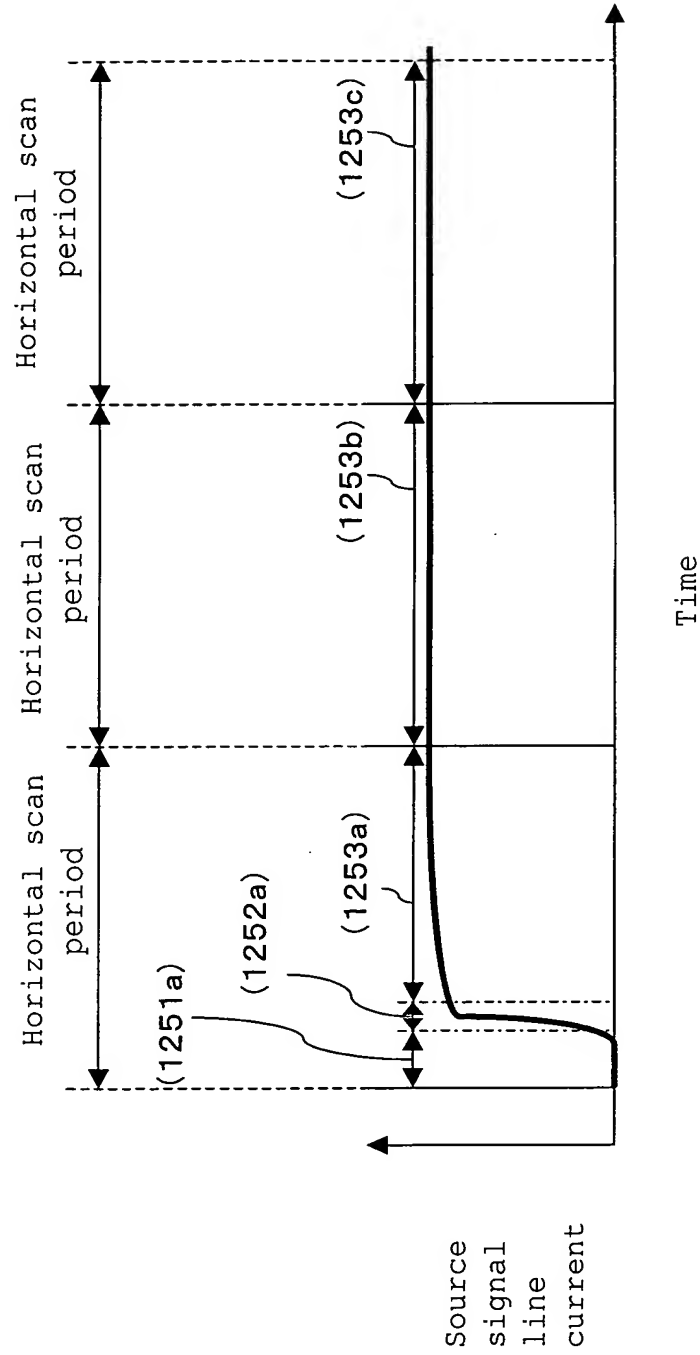
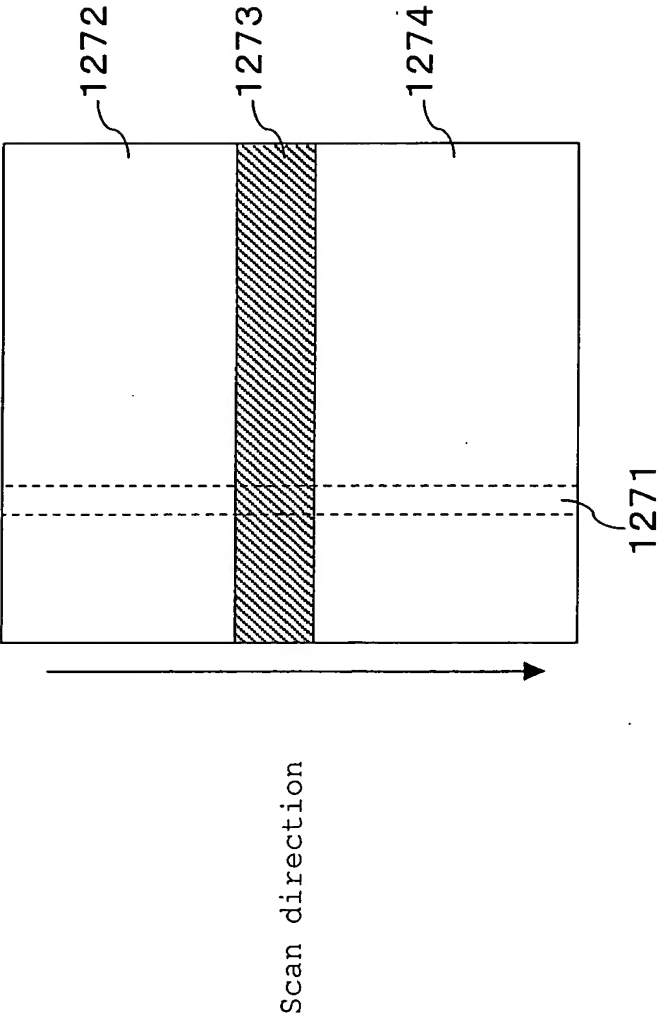
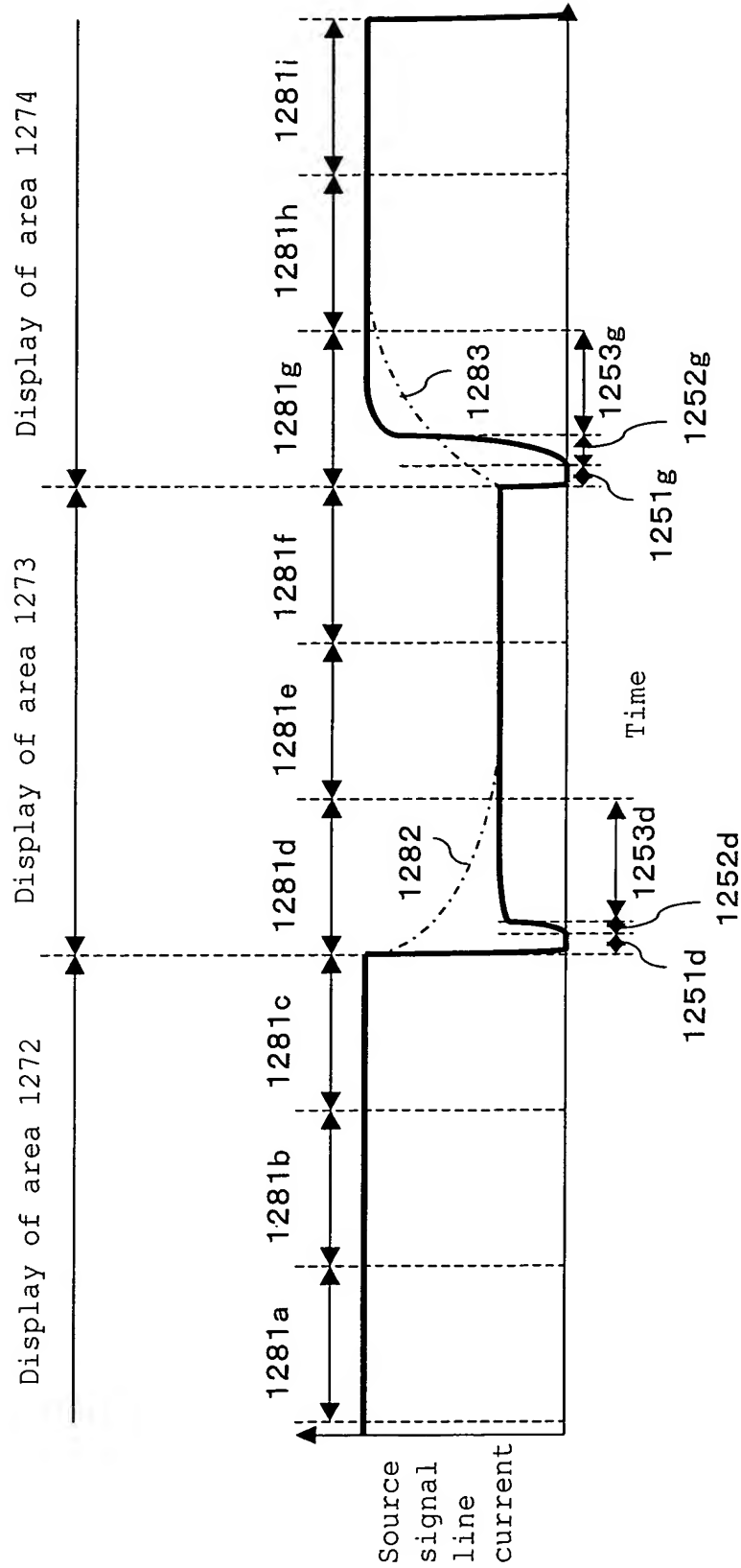


Fig. 127



128/190

Fig. 128



129/190

Fig. 129

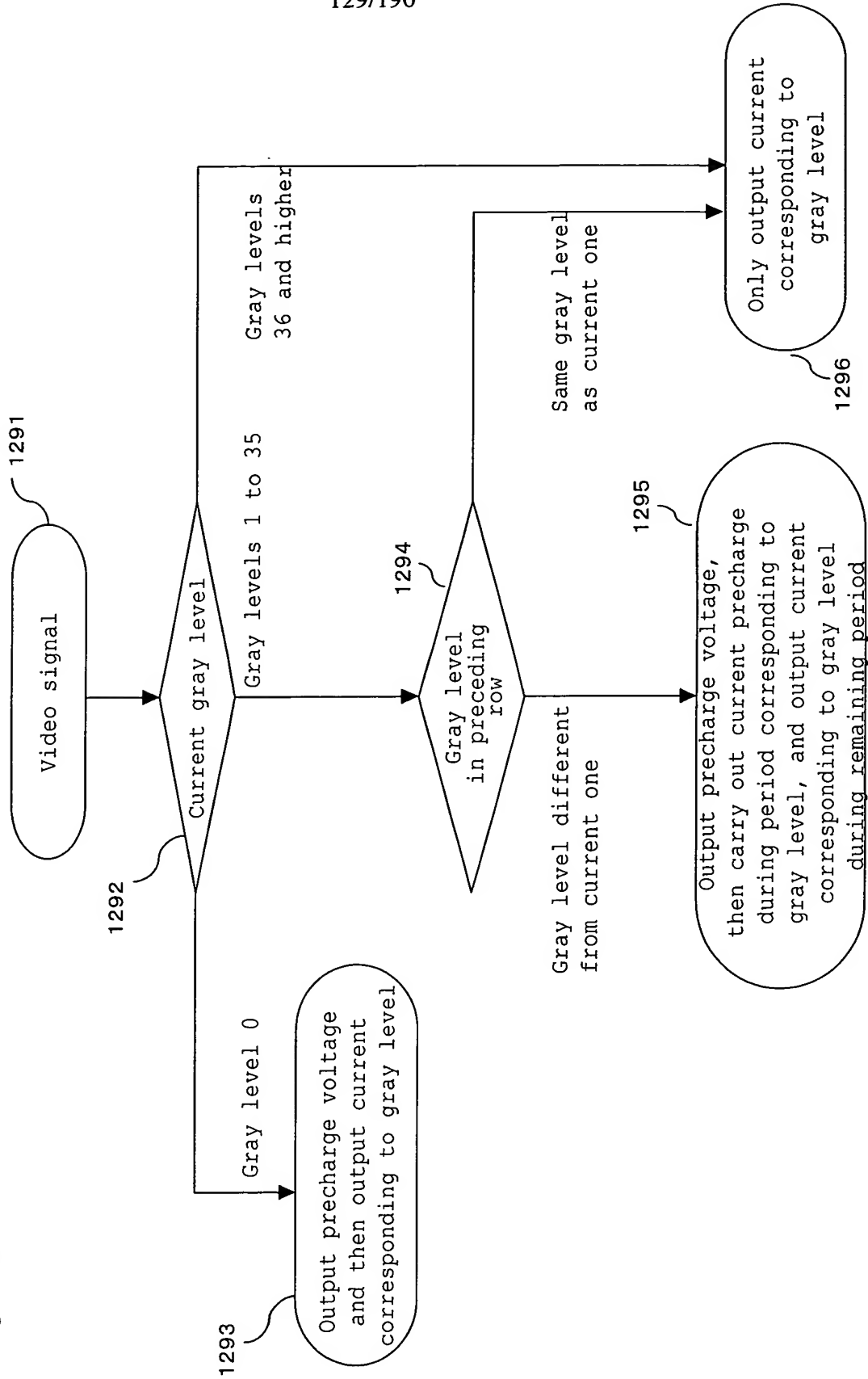
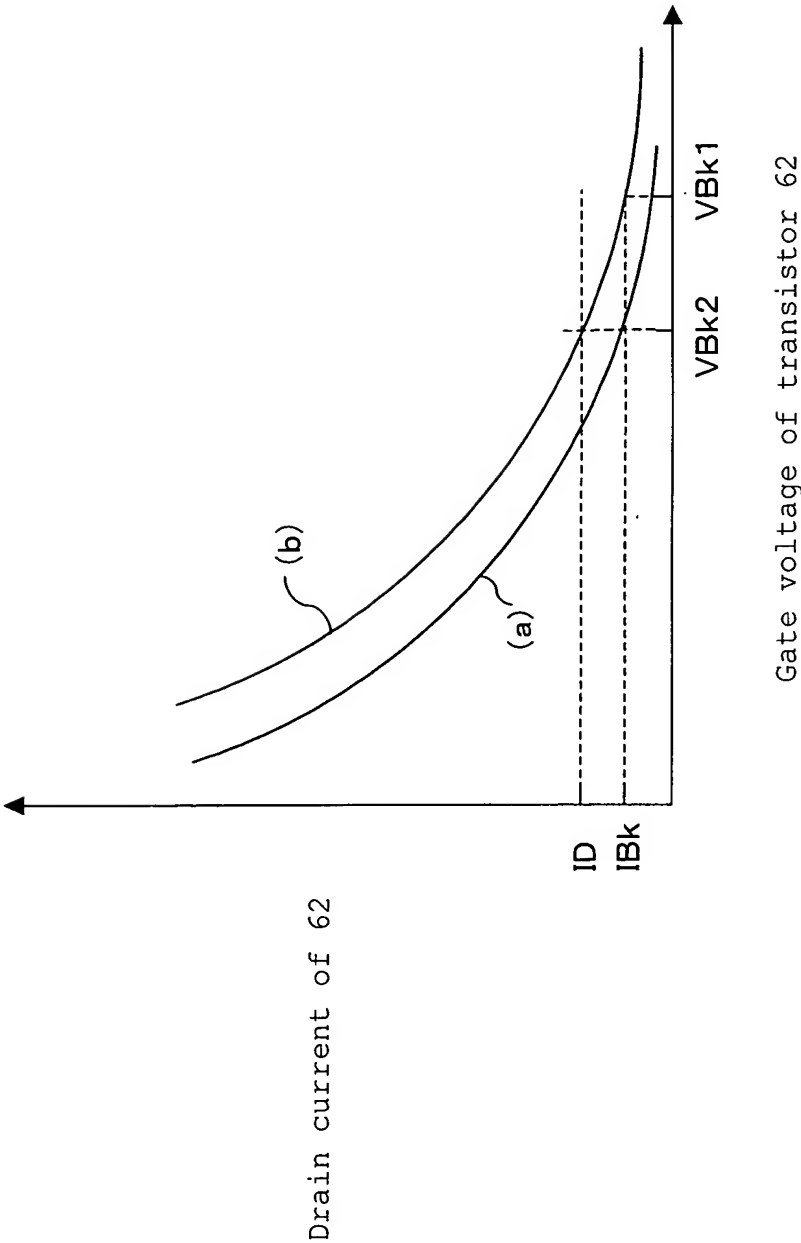
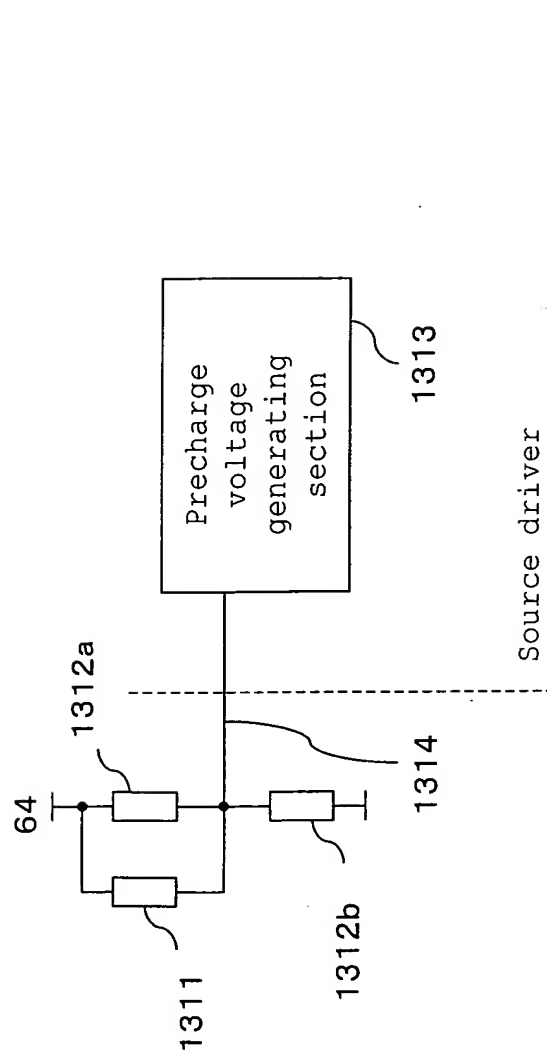


Fig. 130



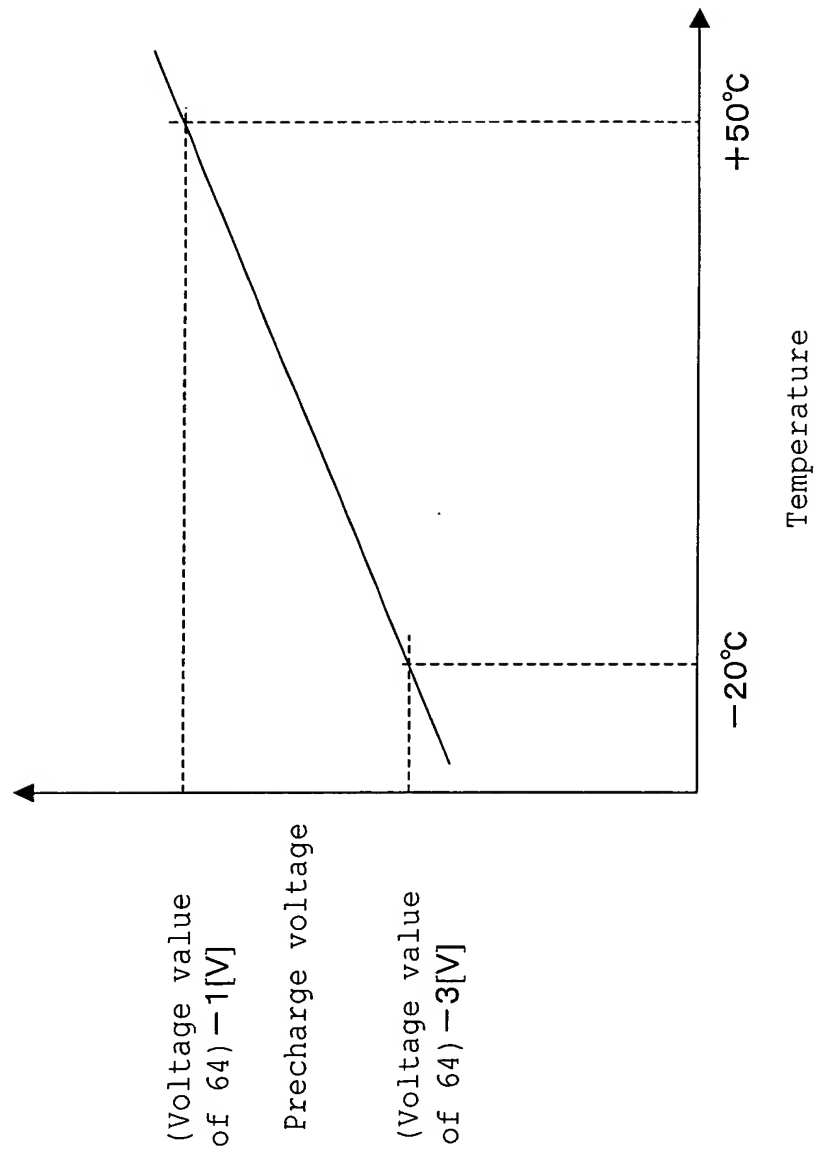
131/190

Fig. 131



132/190

Fig. 132



133/190

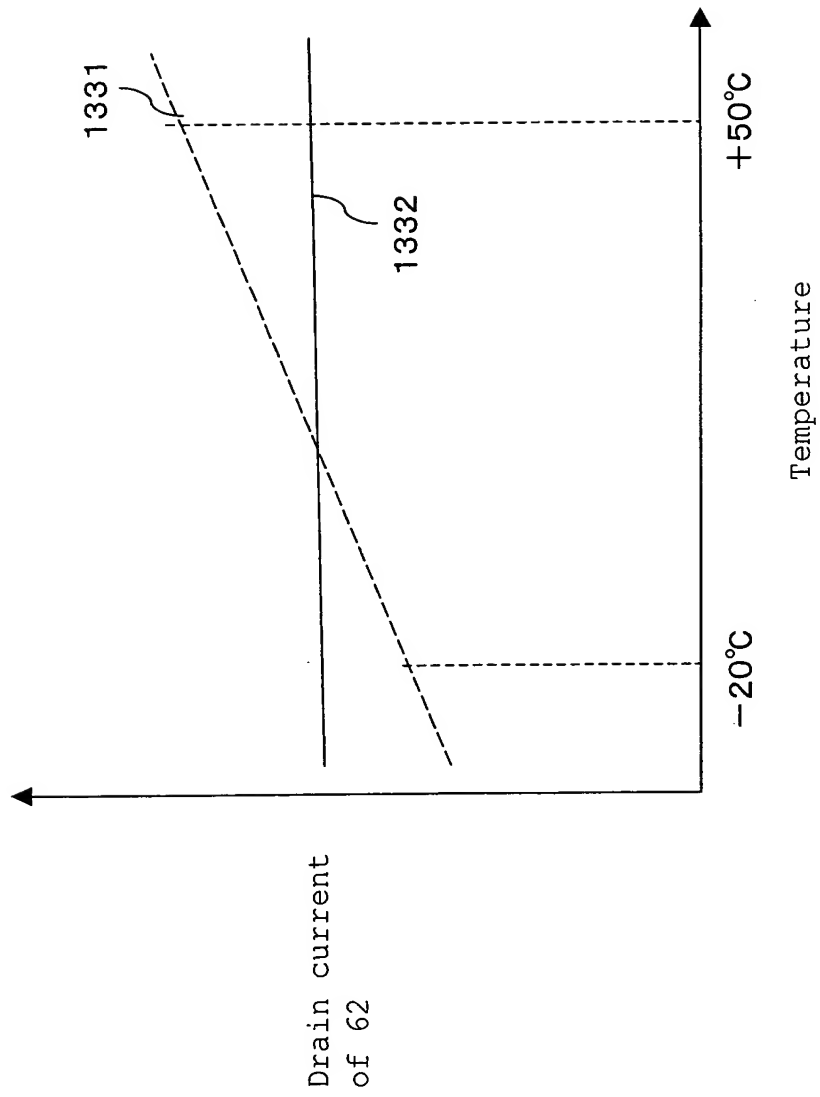
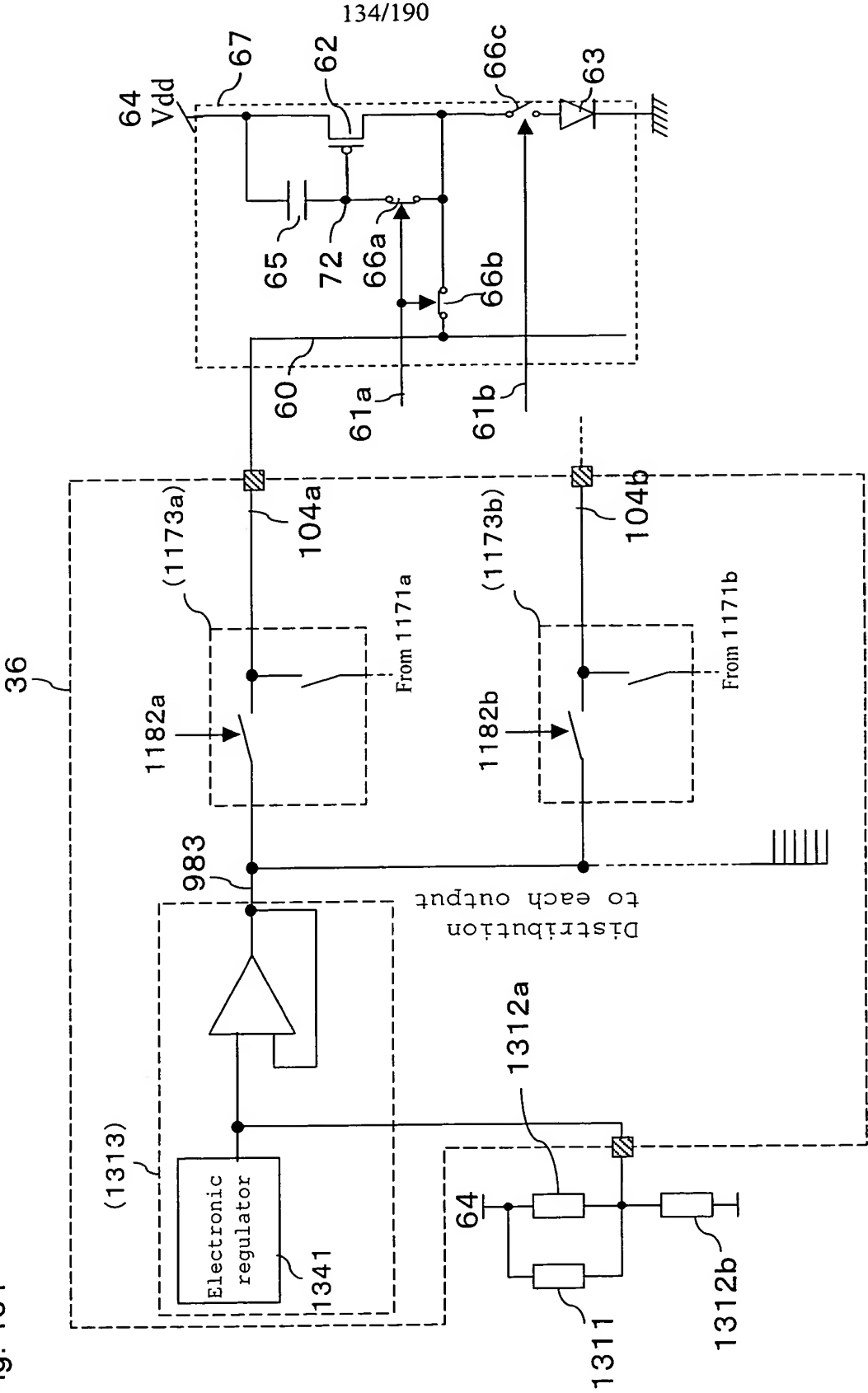
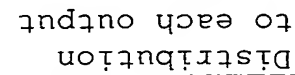


Fig. 133

Fig. 134

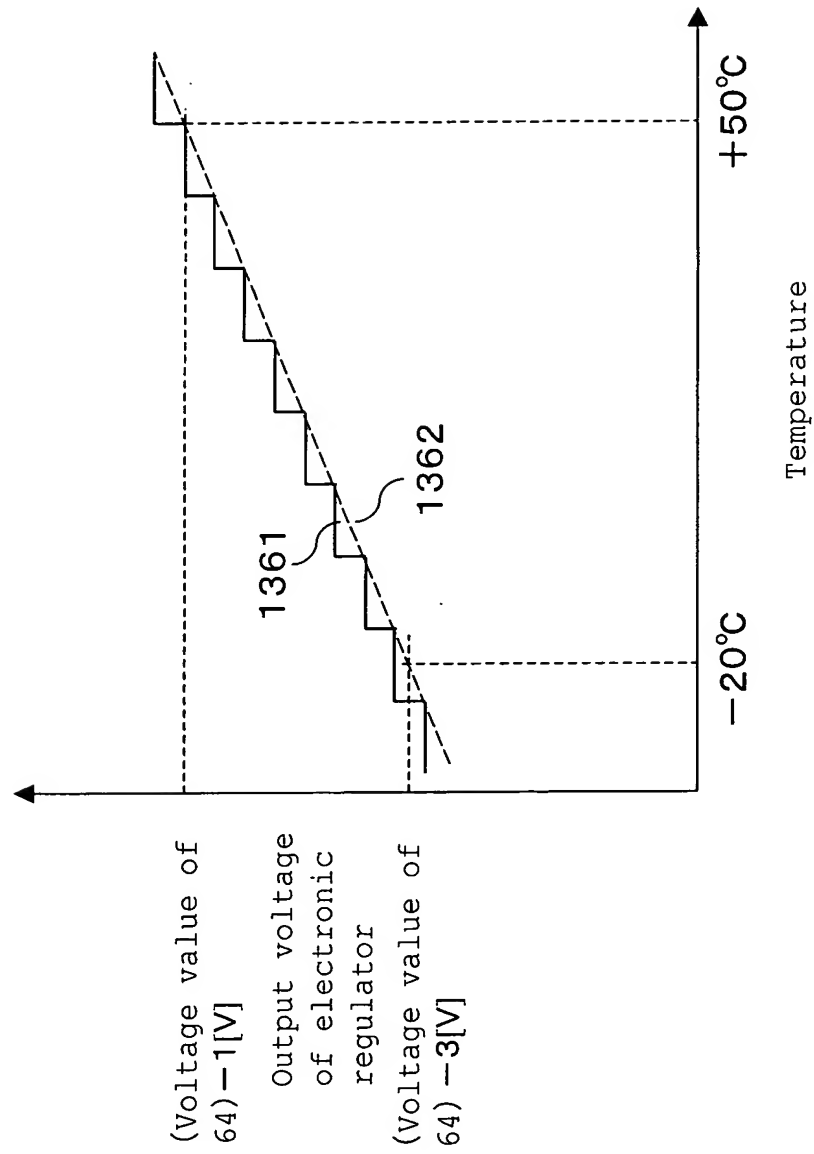


36



136/190

Fig. 136



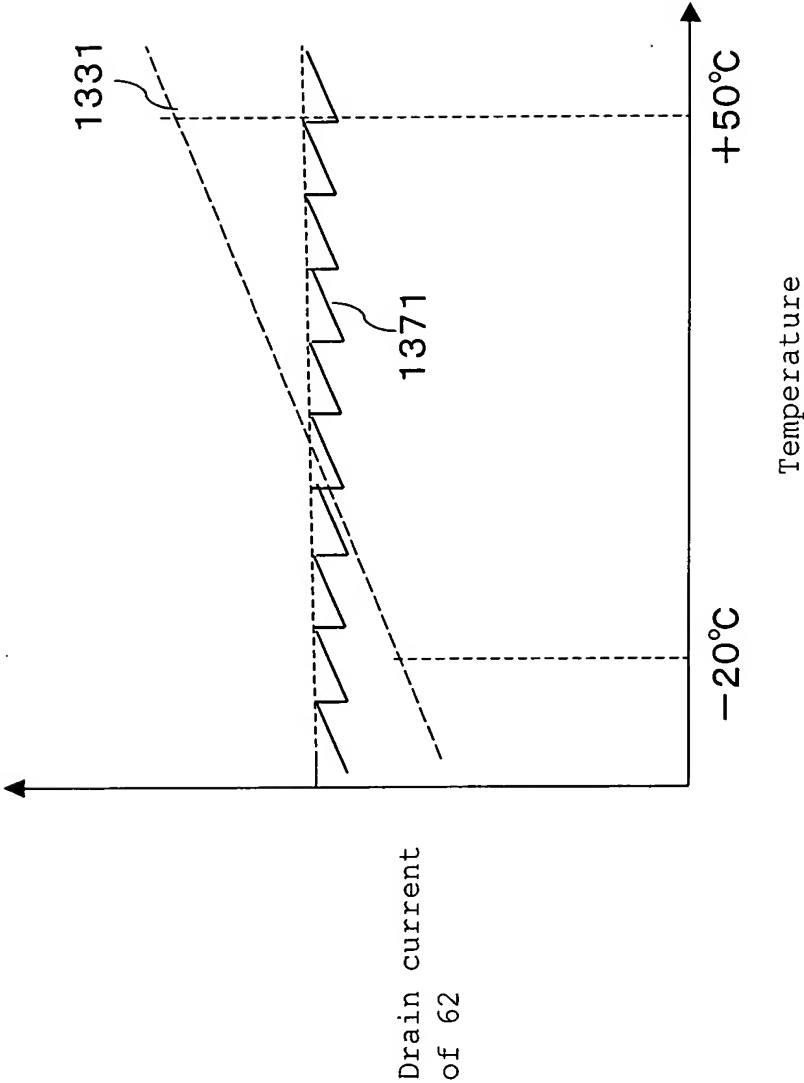
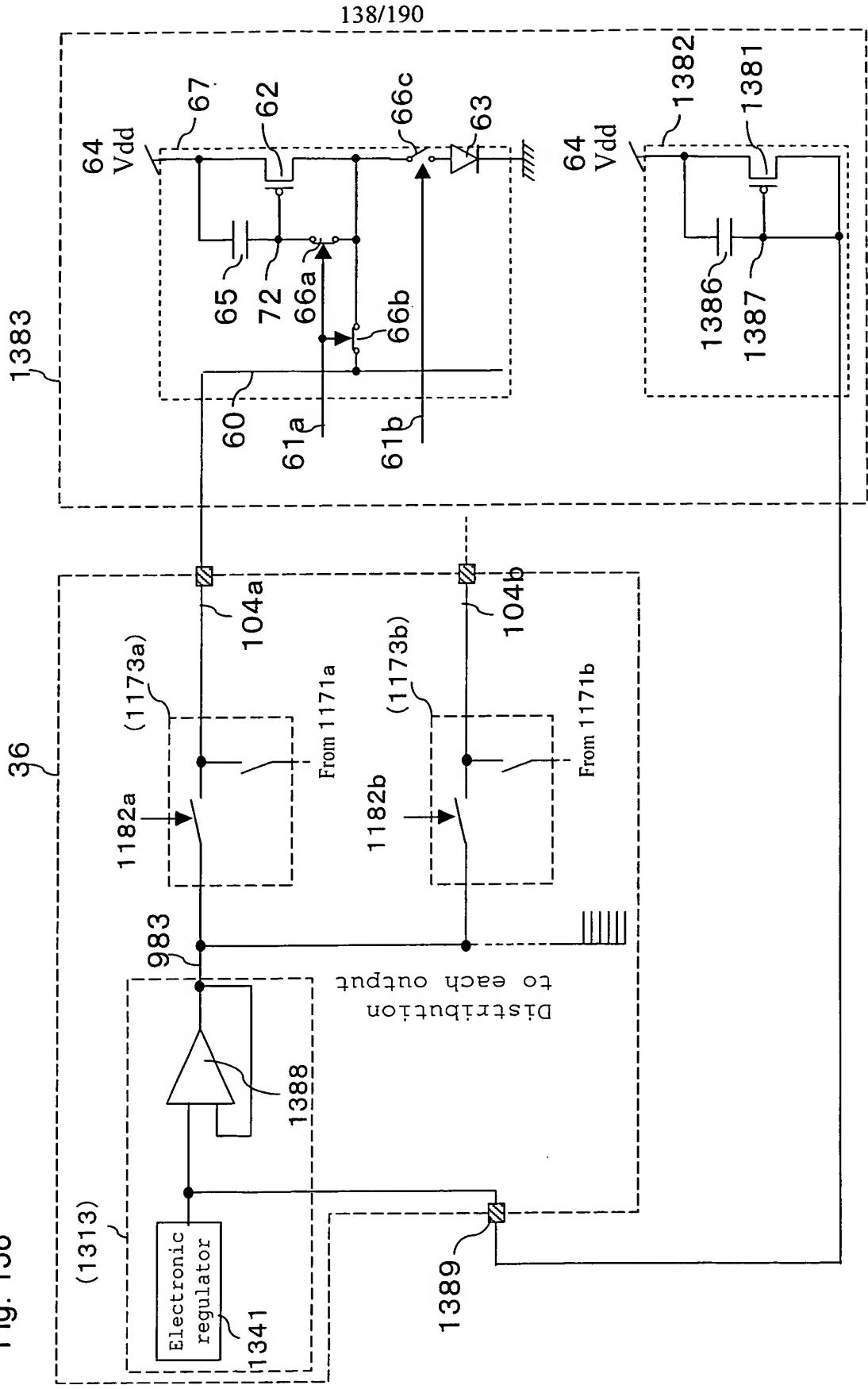


Fig. 137

Fig. 138



139/190

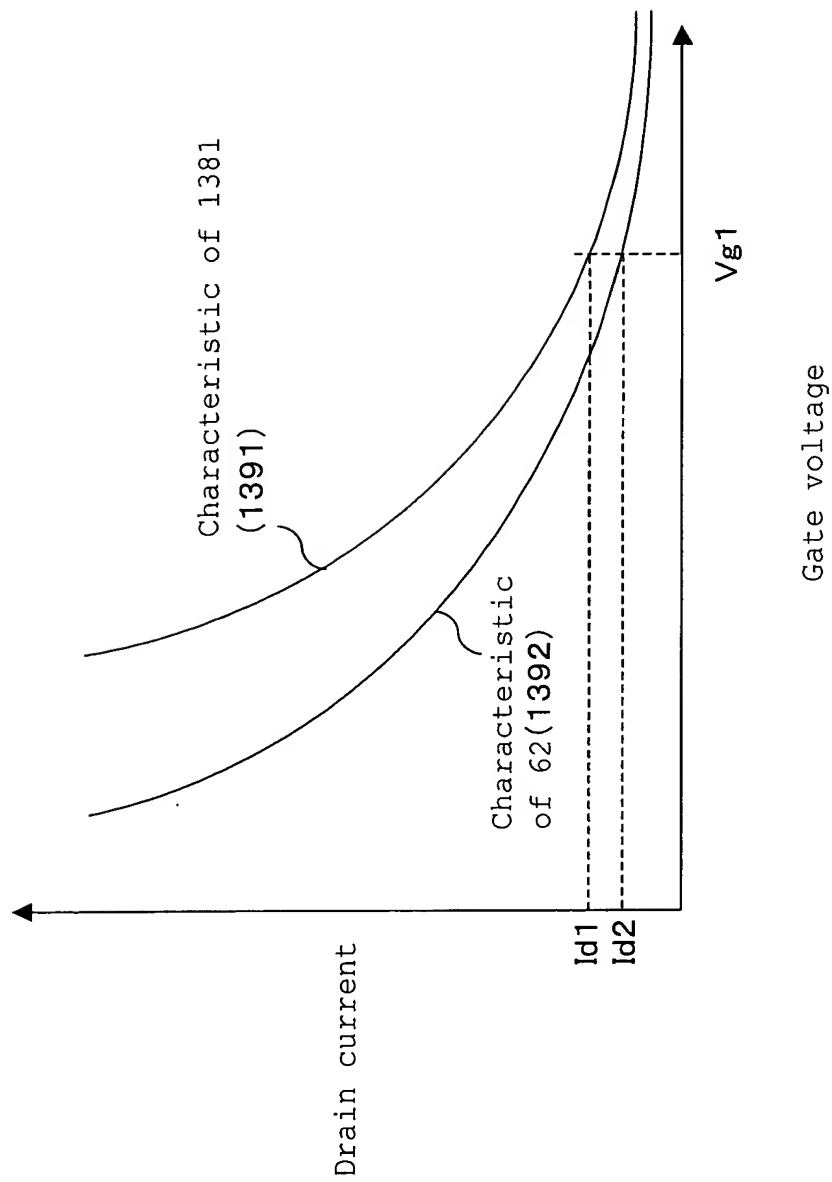


Fig. 139

Fig. 140

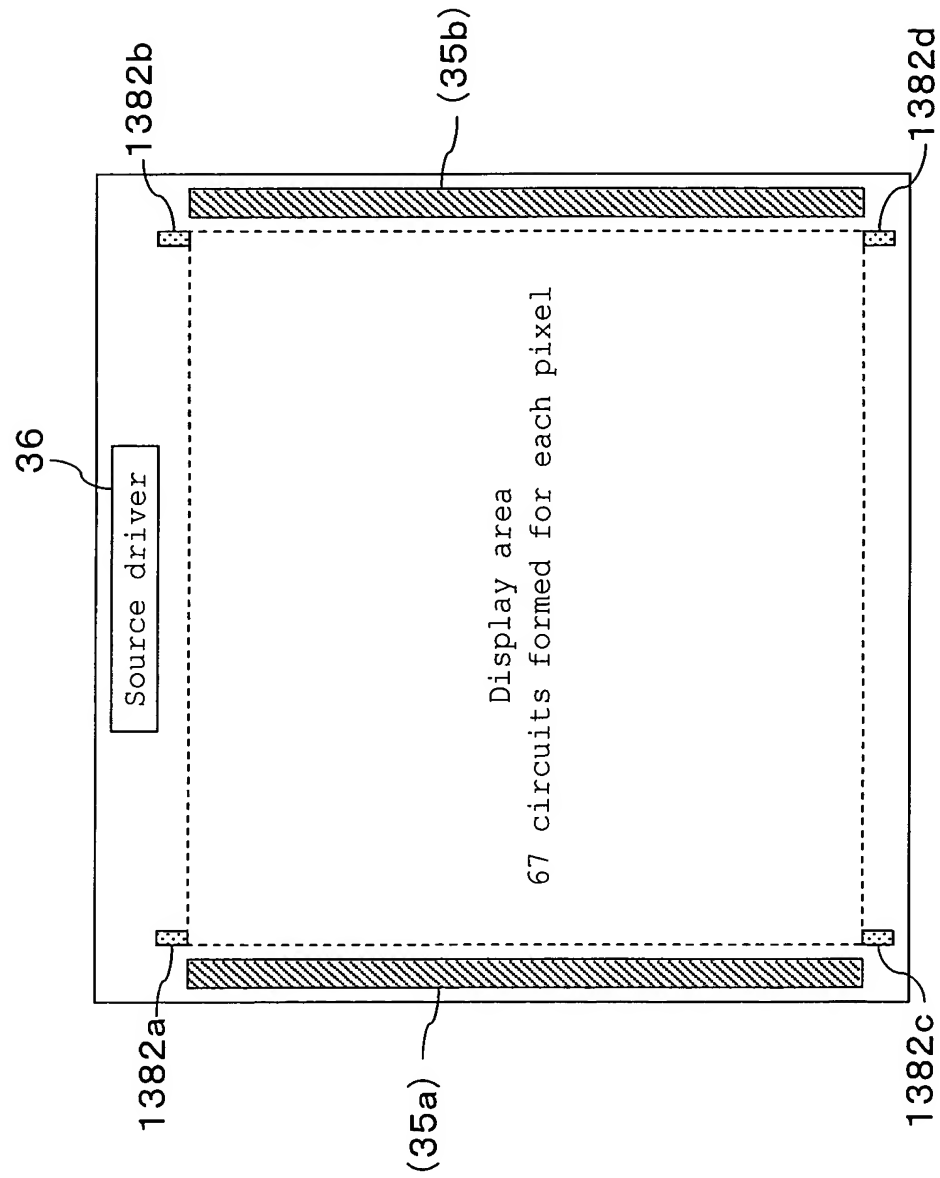


Fig. 141

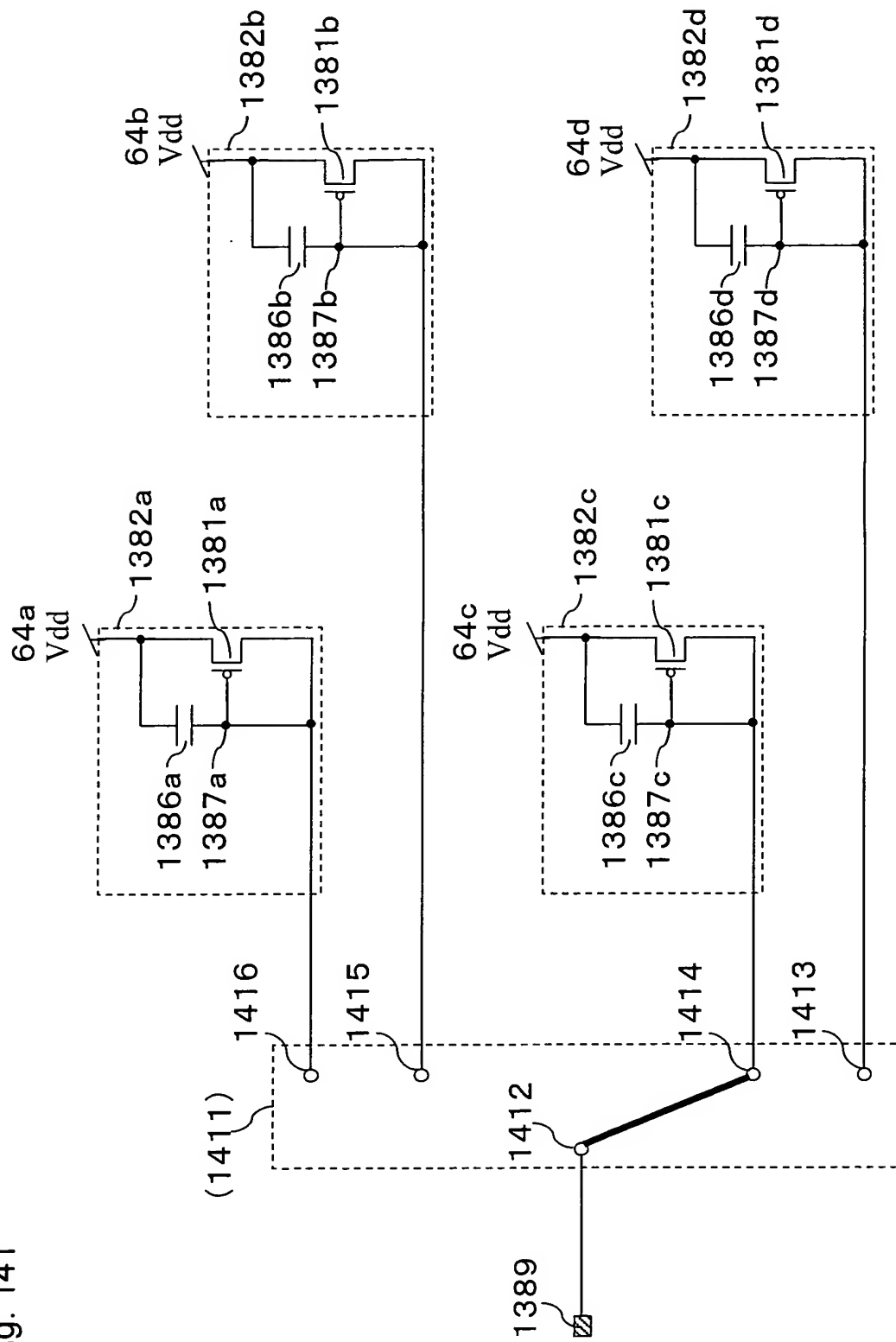
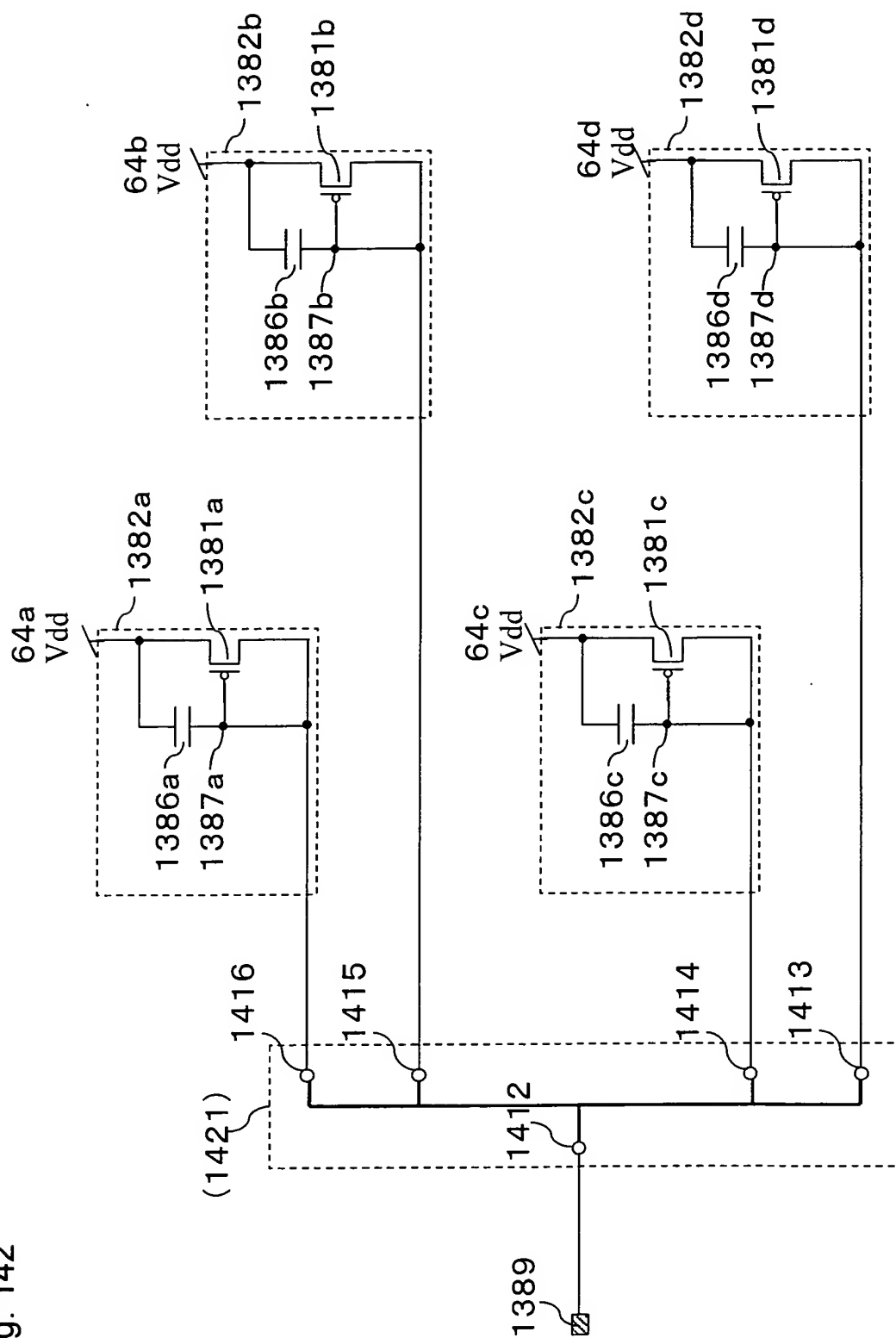


Fig. 142



143/190

Fig. 143

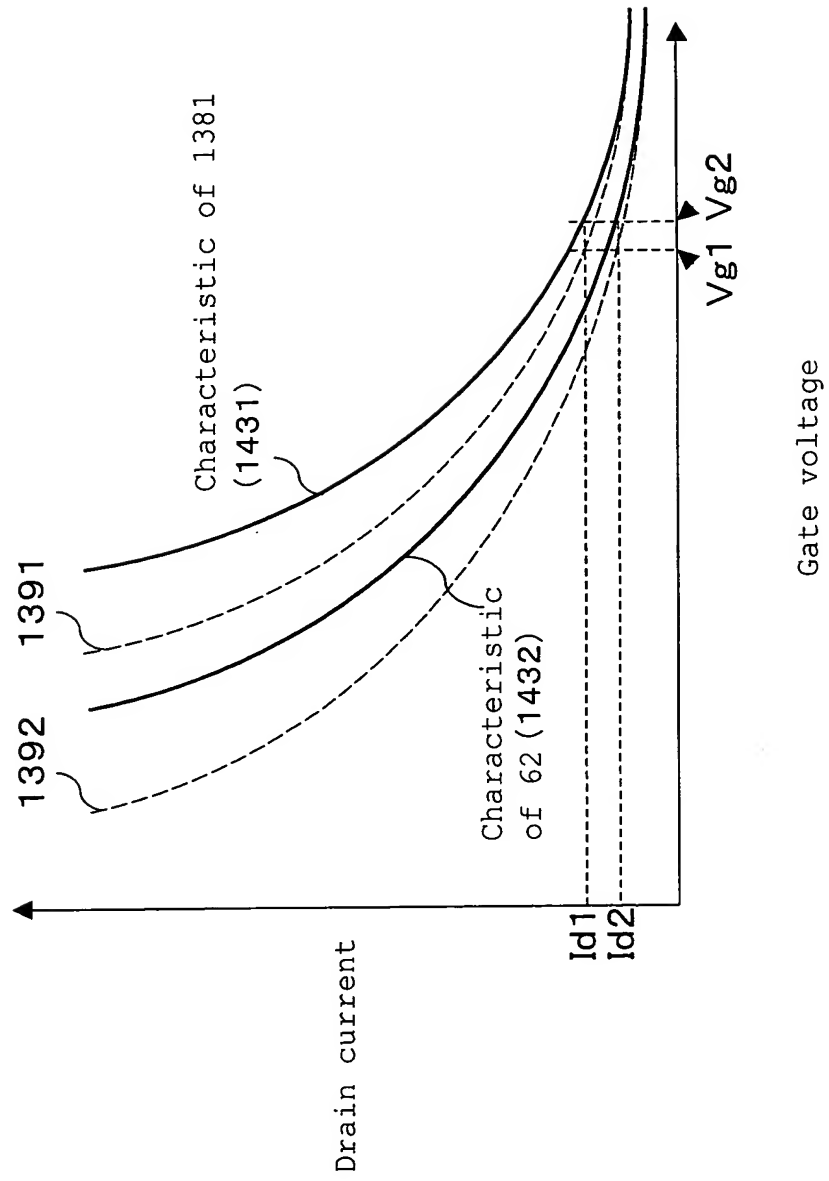
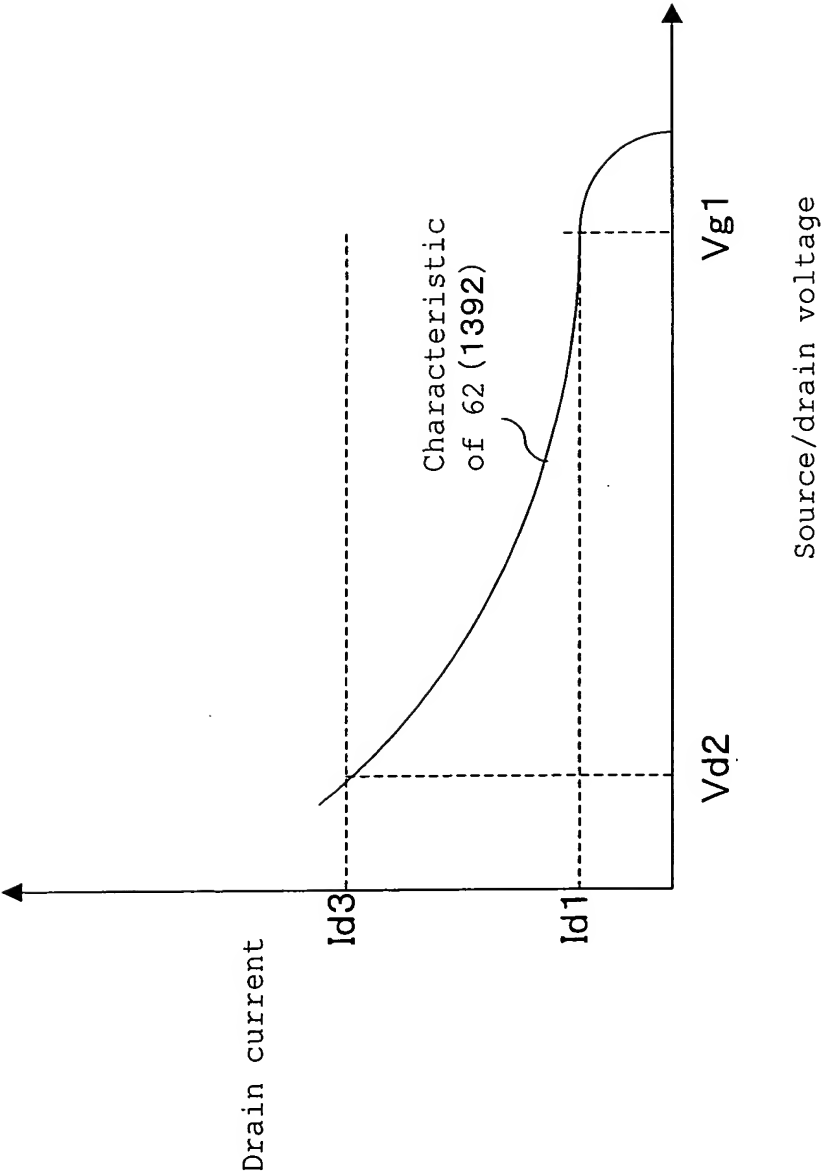
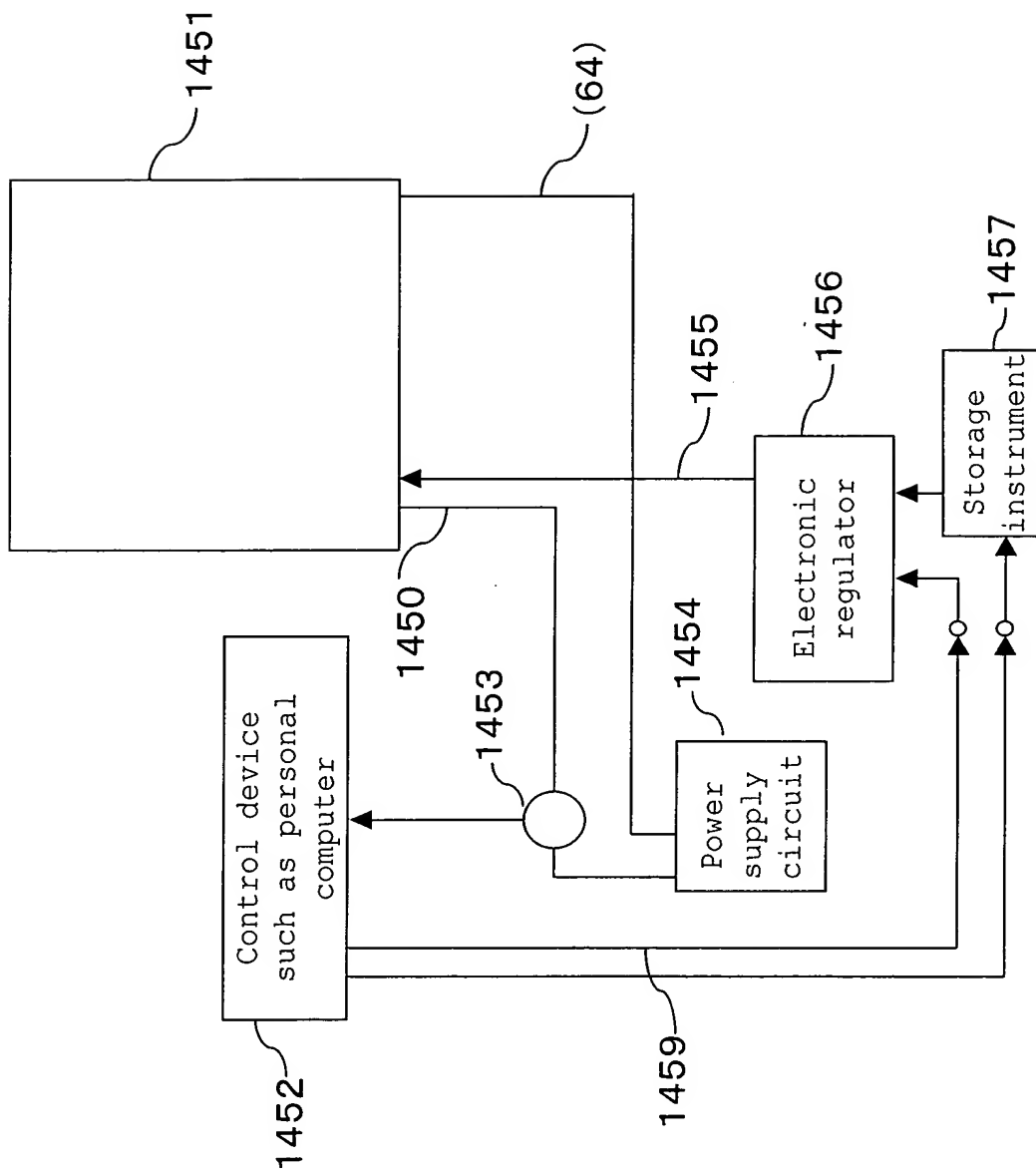


Fig. 144



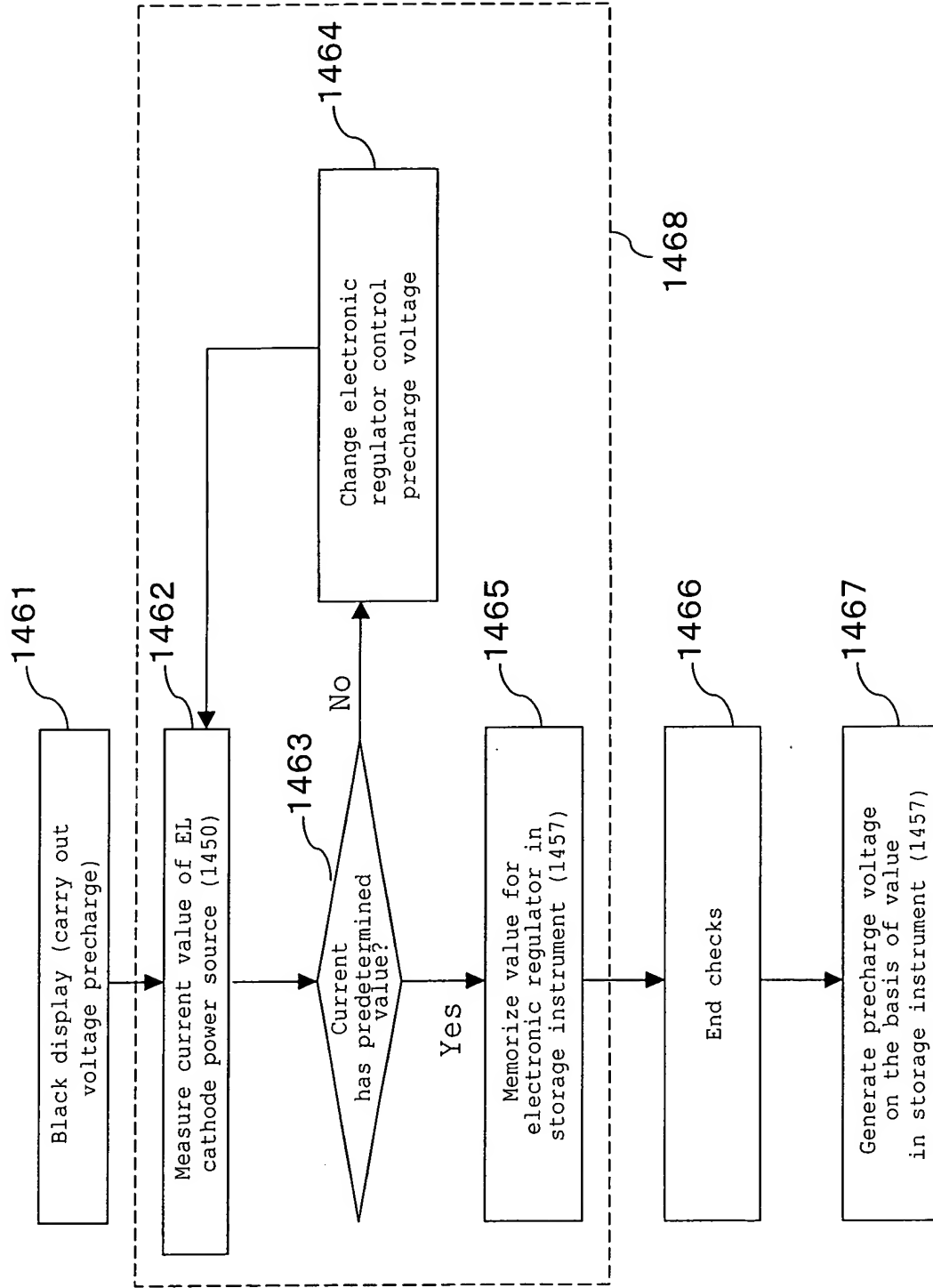
145/190

Fig. 145



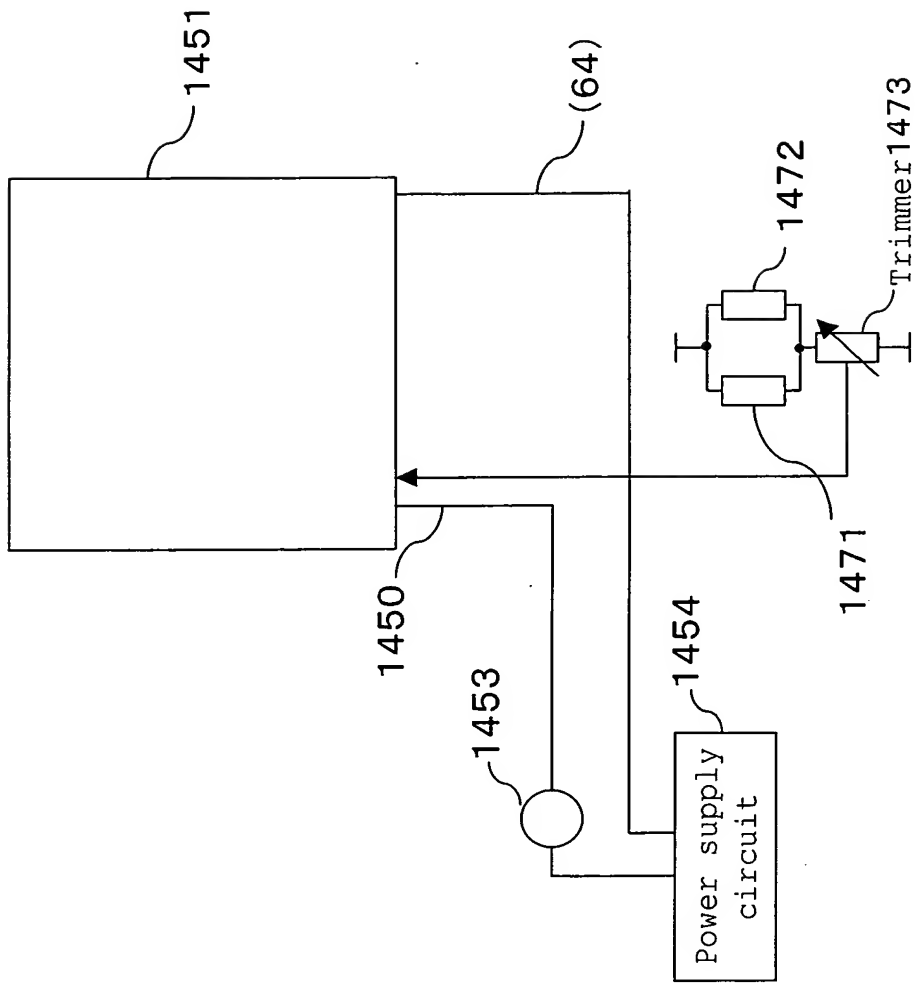
146/190

Fig. 146



147/190

Fig. 147



148/190

Fig. 148

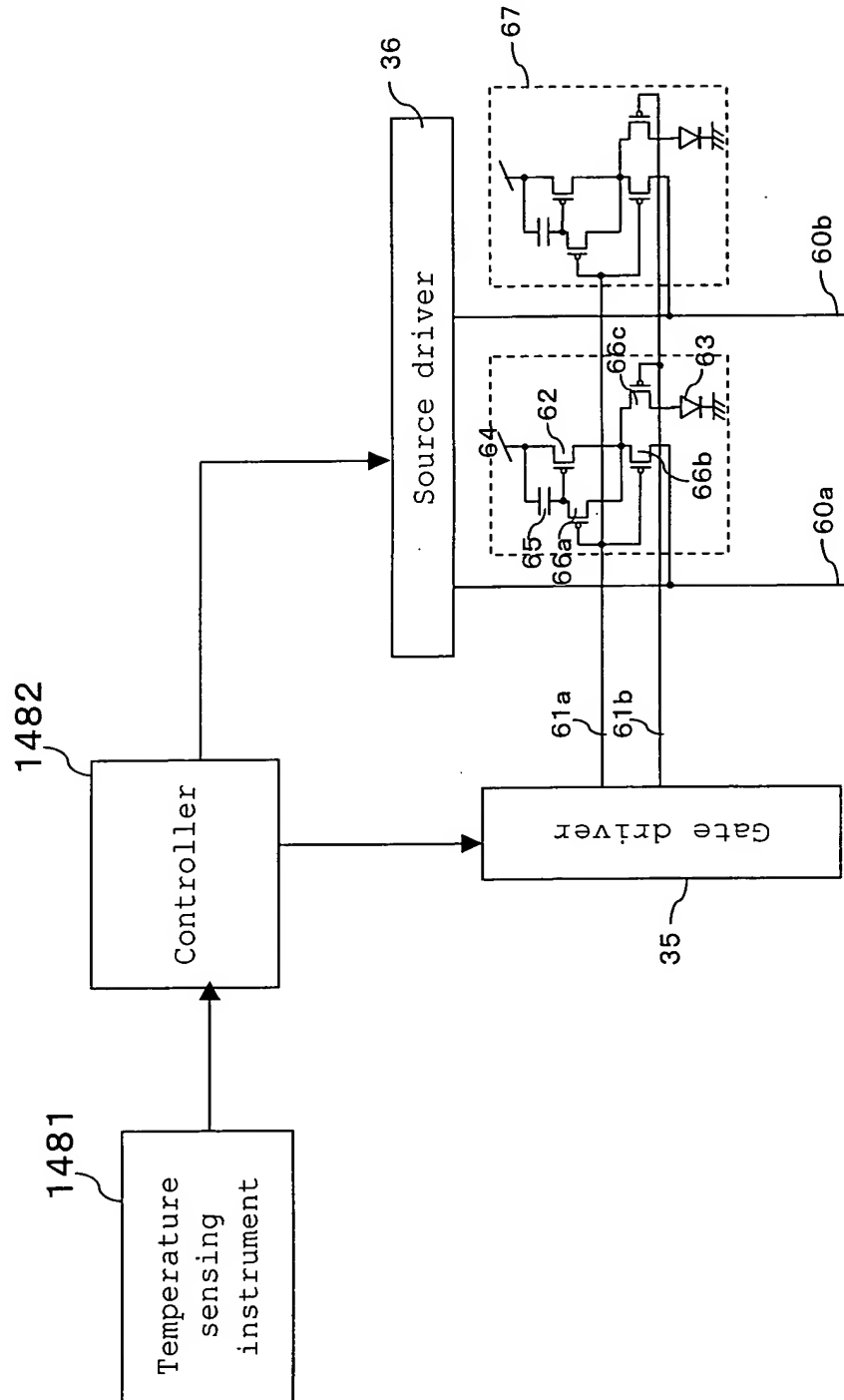


Fig. 149 (a)

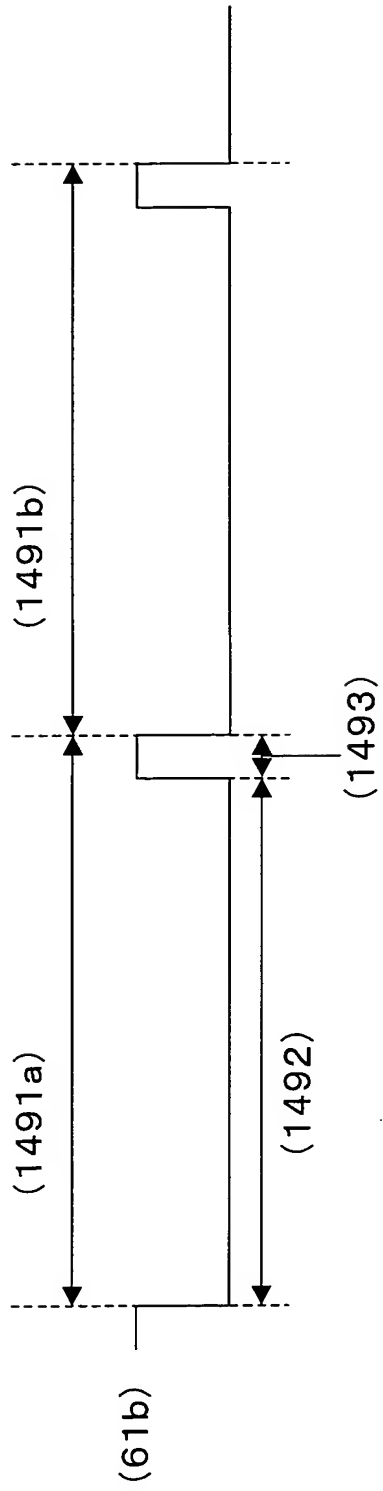
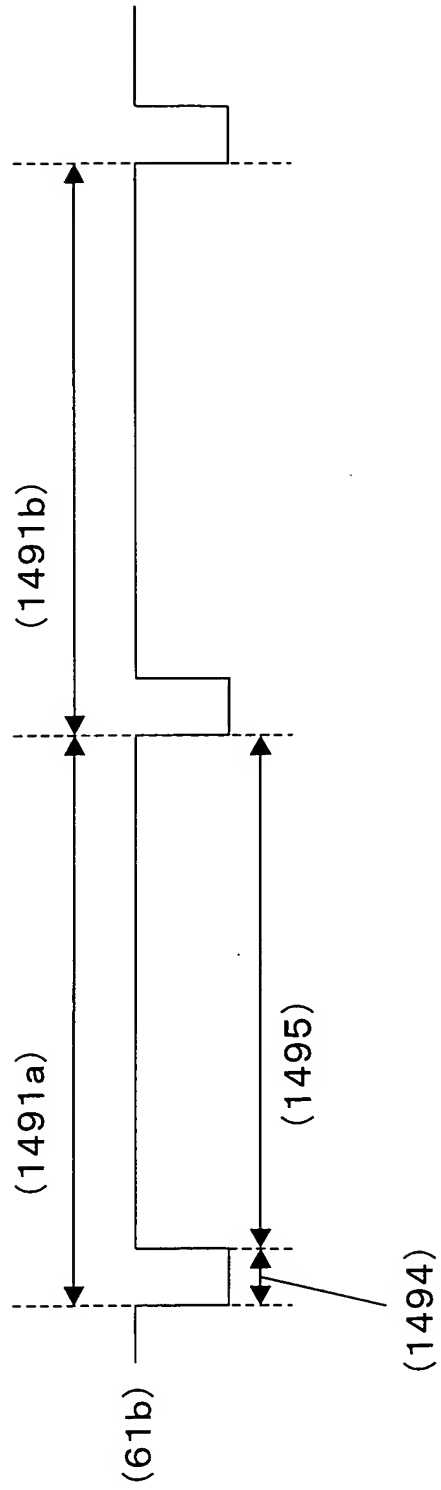
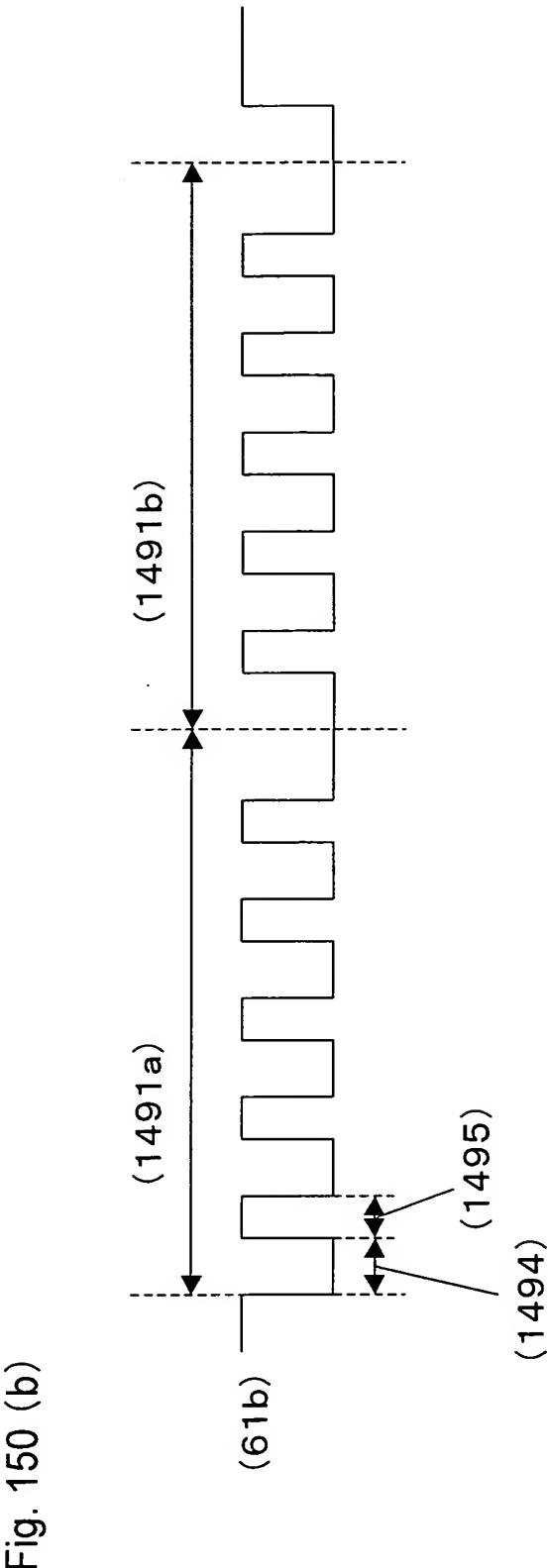
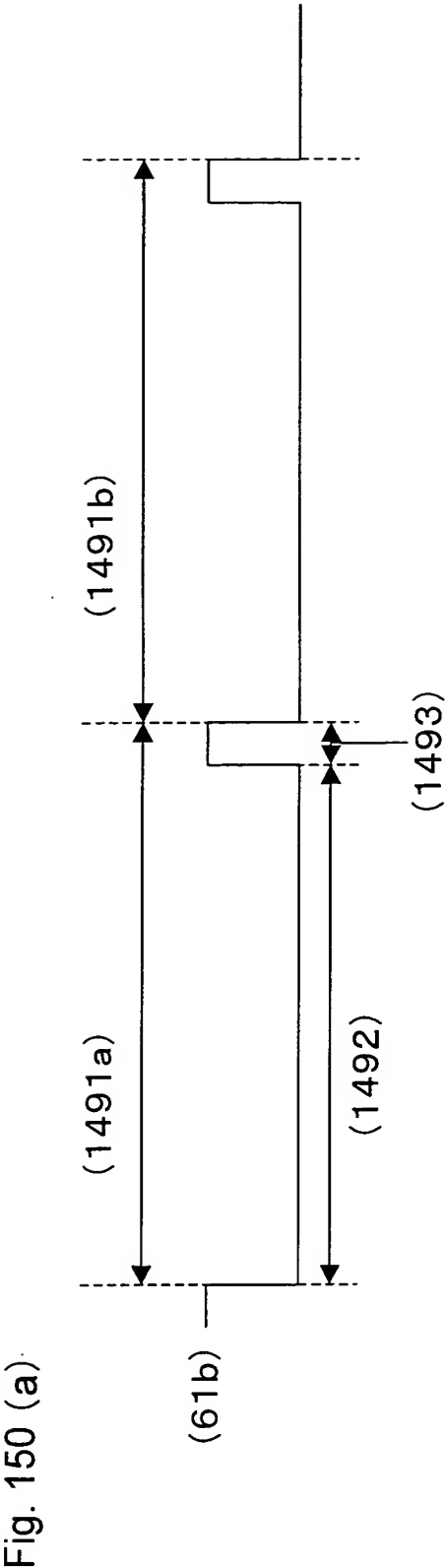


Fig. 149 (b)





151/190

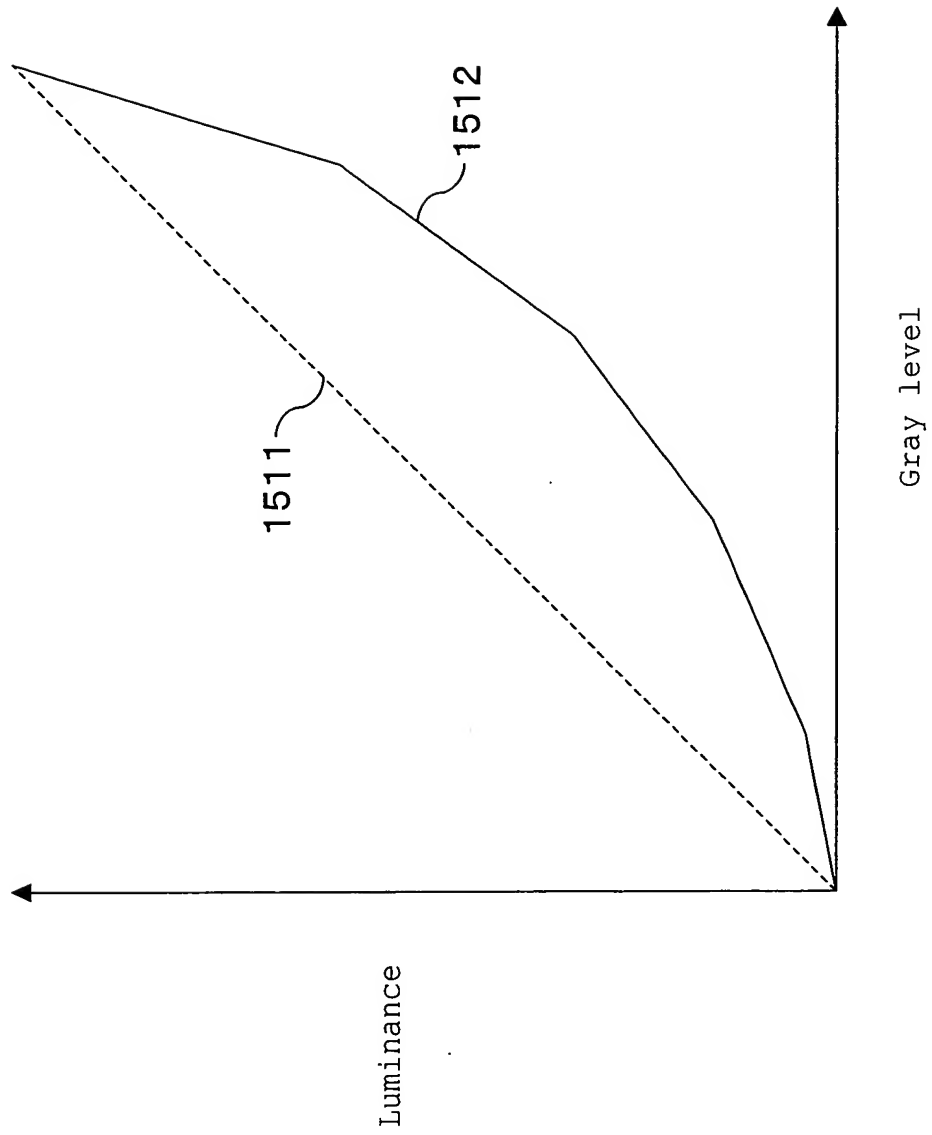
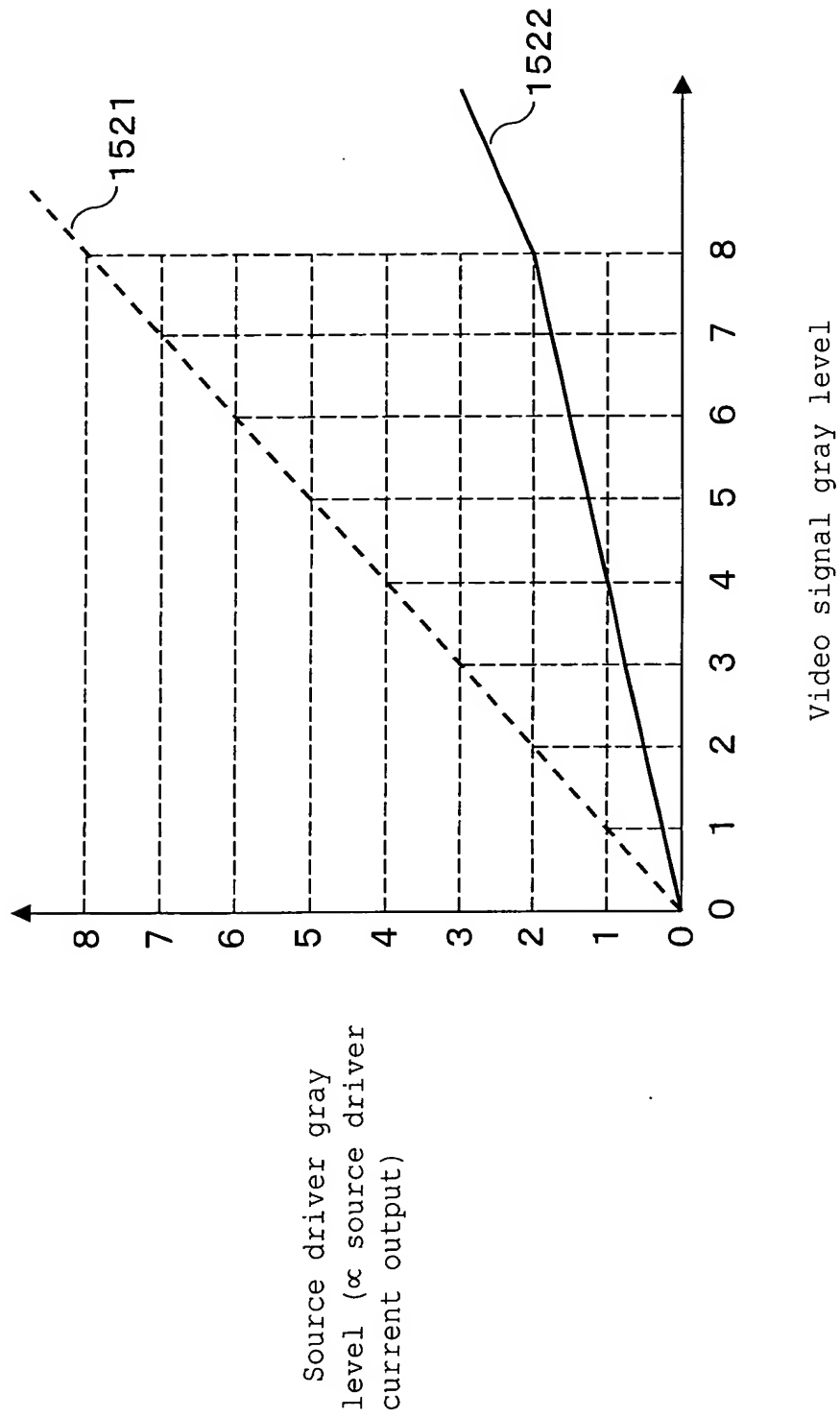


Fig. 151

152/190

Fig. 152



153/190

Fig. 153

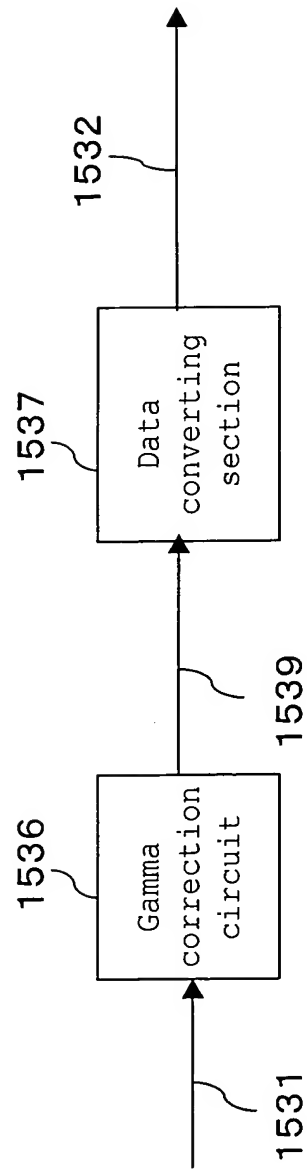


Fig. 154

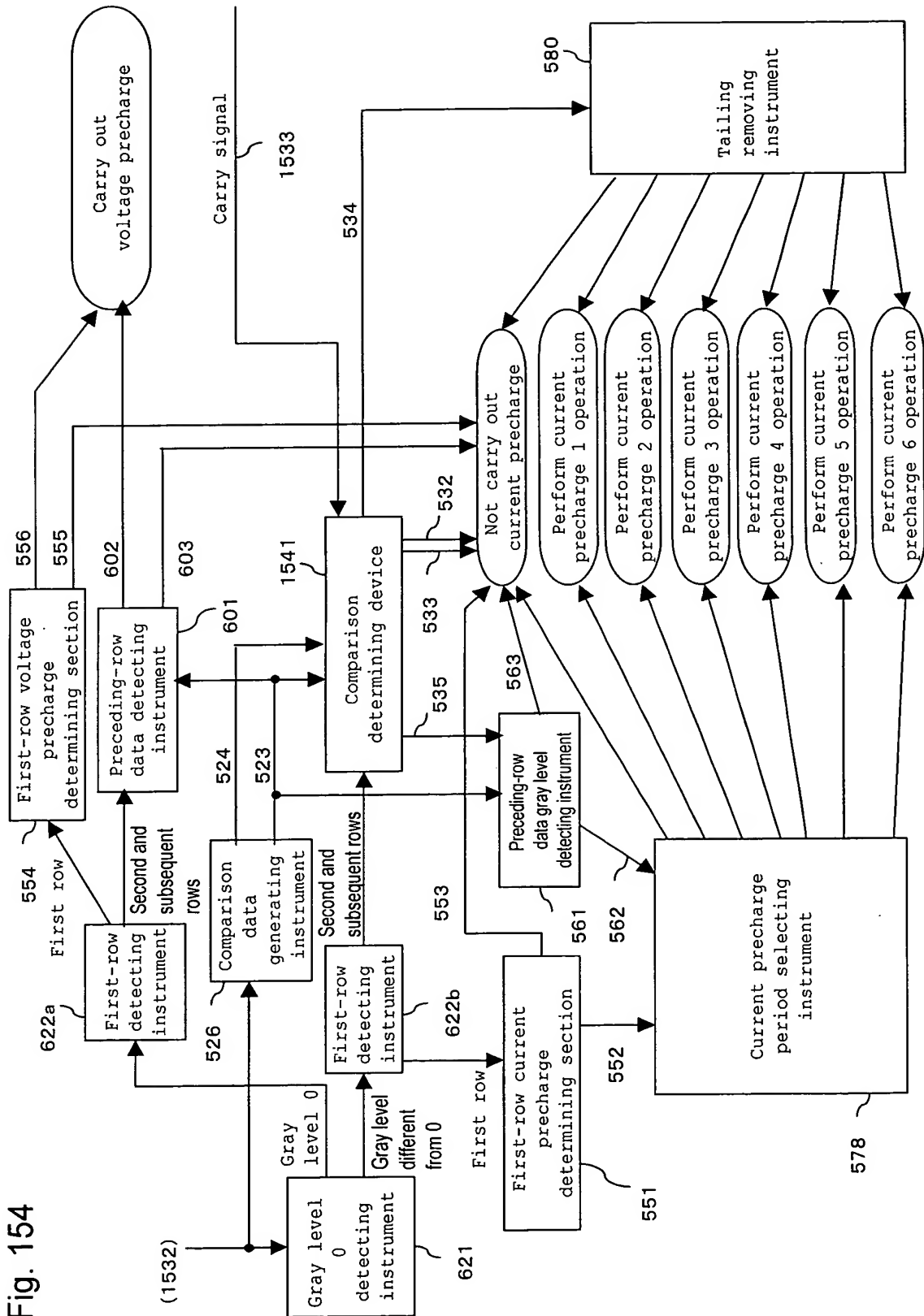


Fig. 155

1553	1554	1555	1556	1557	(1552a)	(1552b)	(1552c)	(1552d)	(1552e)	(1552f)	(1552g)	(1552h)
					0	0	0	1	0	0	0	1
					0	1	0	0	0	1	0	0
					0	0	1	0	0	0	1	0
					(1551a)	(1551b)	(1551c)	(1551d)				

Fig. 156

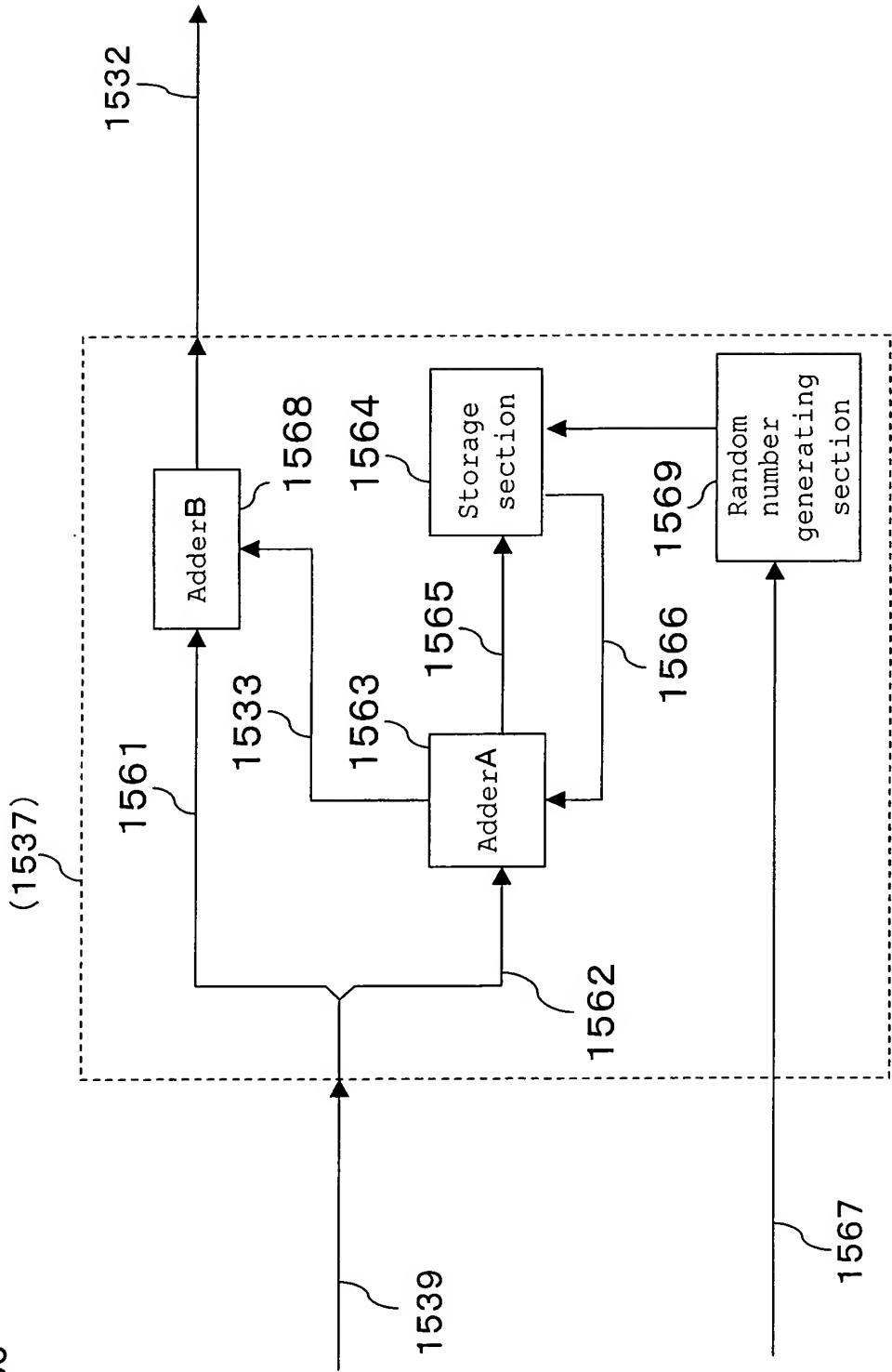


Fig. 157

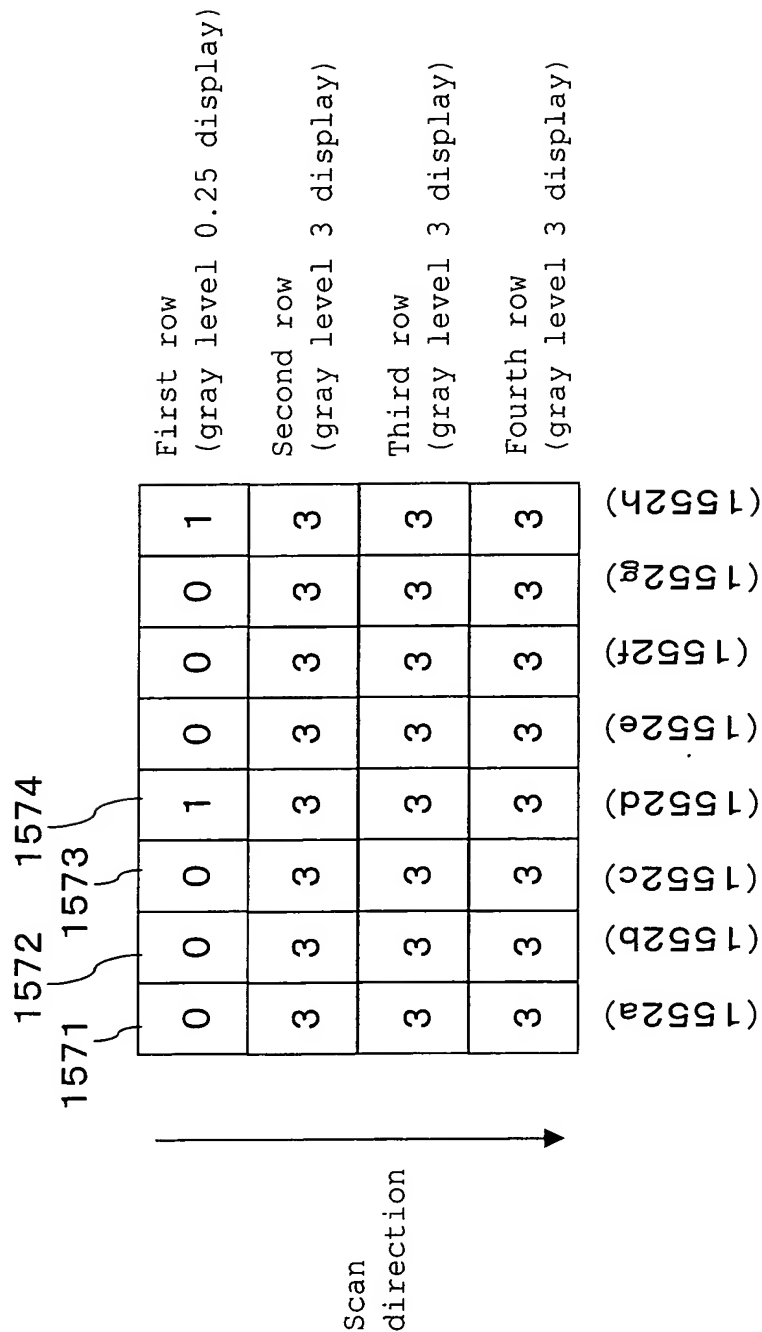


Fig. 158

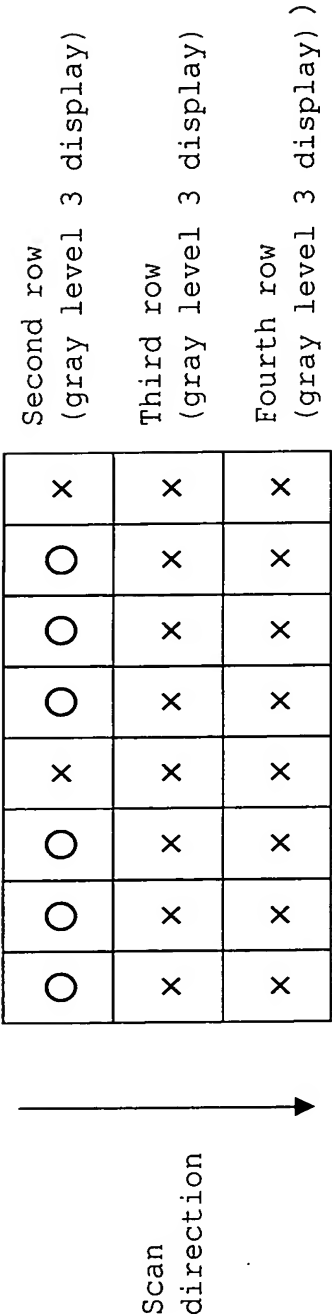


Fig. 159

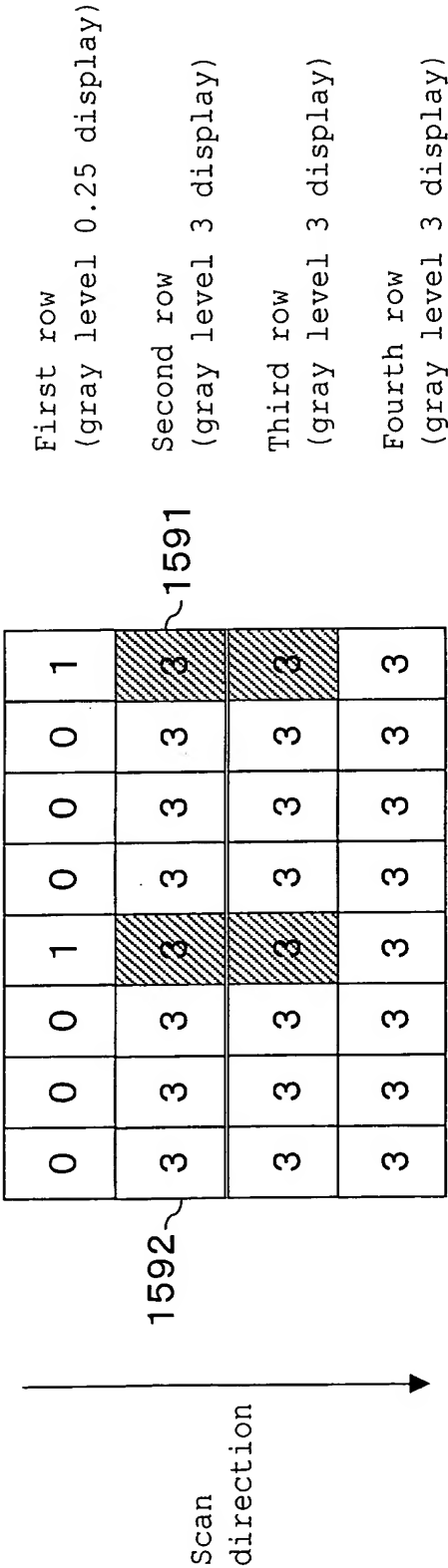


Fig. 160(b)

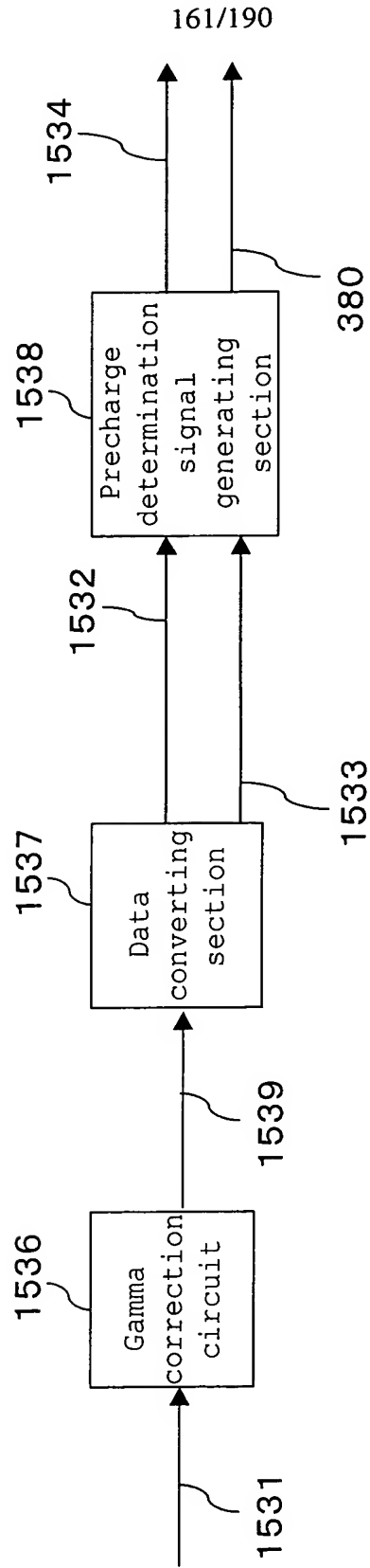
Fig. 160 (a)

Scan direction →

0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)	0 (0)	1 (1)	First row (gray level 0.25 display)
3 (0)	3 (0)	3 (0)	3 (0)	3 (0)	3 (0)	3 (0)	3 (0)	Second row (gray level 3 display)
3 (0)	3 (0)	3 (0)	3 (0)	3 (0)	3 (0)	3 (0)	3 (0)	Third row (gray level 3 display)
3 (0)	3 (0)	3 (0)	3 (0)	3 (0)	3 (0)	3 (0)	3 (0)	Fourth row (gray level 3 display)

○	○	○	○	○	○	○	○
x	x	x	x	x	x	x	x
x	x	x	x	x	x	x	x

Fig. 161



162/190

Fig. 162

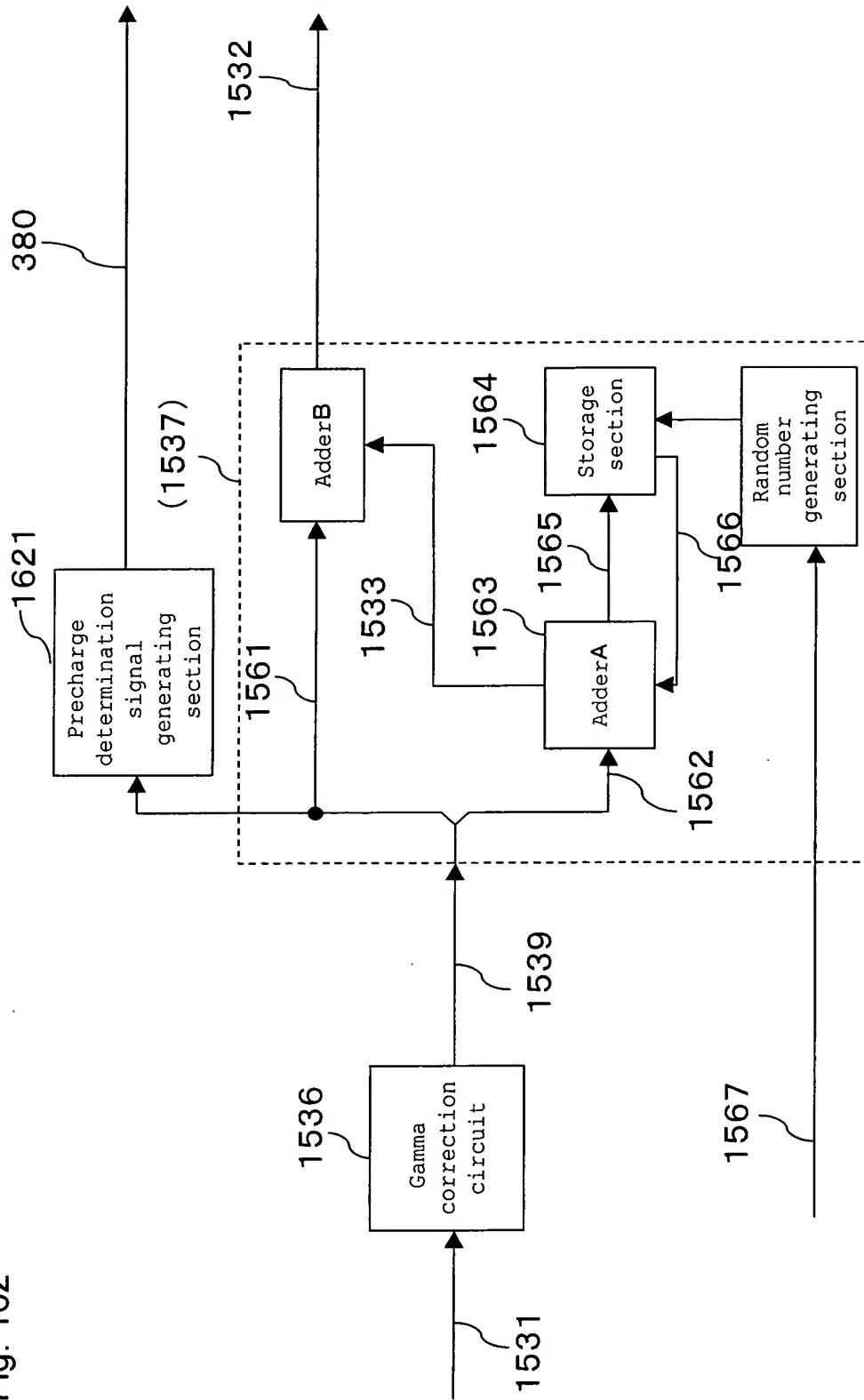


Fig. 163

Diagram illustrating a 4x8 grid of pixels. The scan direction is indicated by an arrow pointing downwards. The rows are labeled as follows:

- First row (gray level 0.25 display)
- Second row (gray level 3 display)
- Third row (gray level 3 display)
- Fourth row (gray level 3 display)

The grid shows a pattern of 0 and 3 values, representing different gray levels. The first row contains 0s, and the subsequent three rows contain 3s.

0	0	0	0	0	0	0	0
3	3	3	3	3	3	3	3
3	3	3	3	3	3	3	3
3	3	3	3	3	3	3	3

Fig. 164

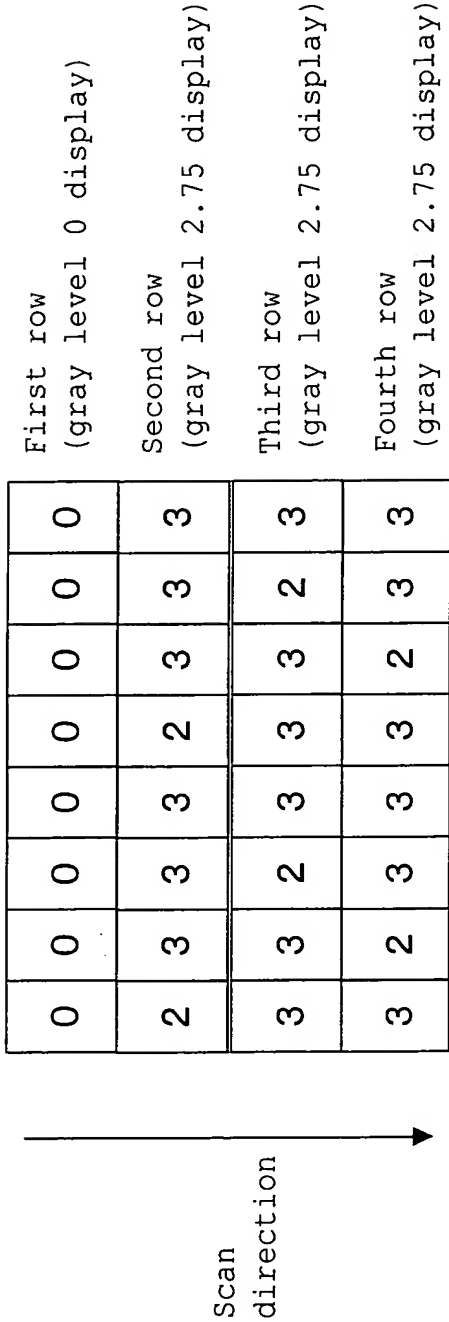


Fig. 165

Scan
direction

0	0	0	0	0	0	0	0	First row (gray level 0 display)
2	2	2	2	2	2	2	2	Second row (gray level 2.75 display)
2	2	2	2	2	2	2	2	Third row (gray level 2.75 display)
2	2	2	2	2	2	2	2	Fourth row (gray level 2.75 display)

Fig. 166

Carry signal for preceding row (1533)	Current carry signal(1533)	Determination
0	0	Not carry out precharge
0	1	Not carry out precharge
1	0	Carry out precharge
1	1	Not carry out precharge

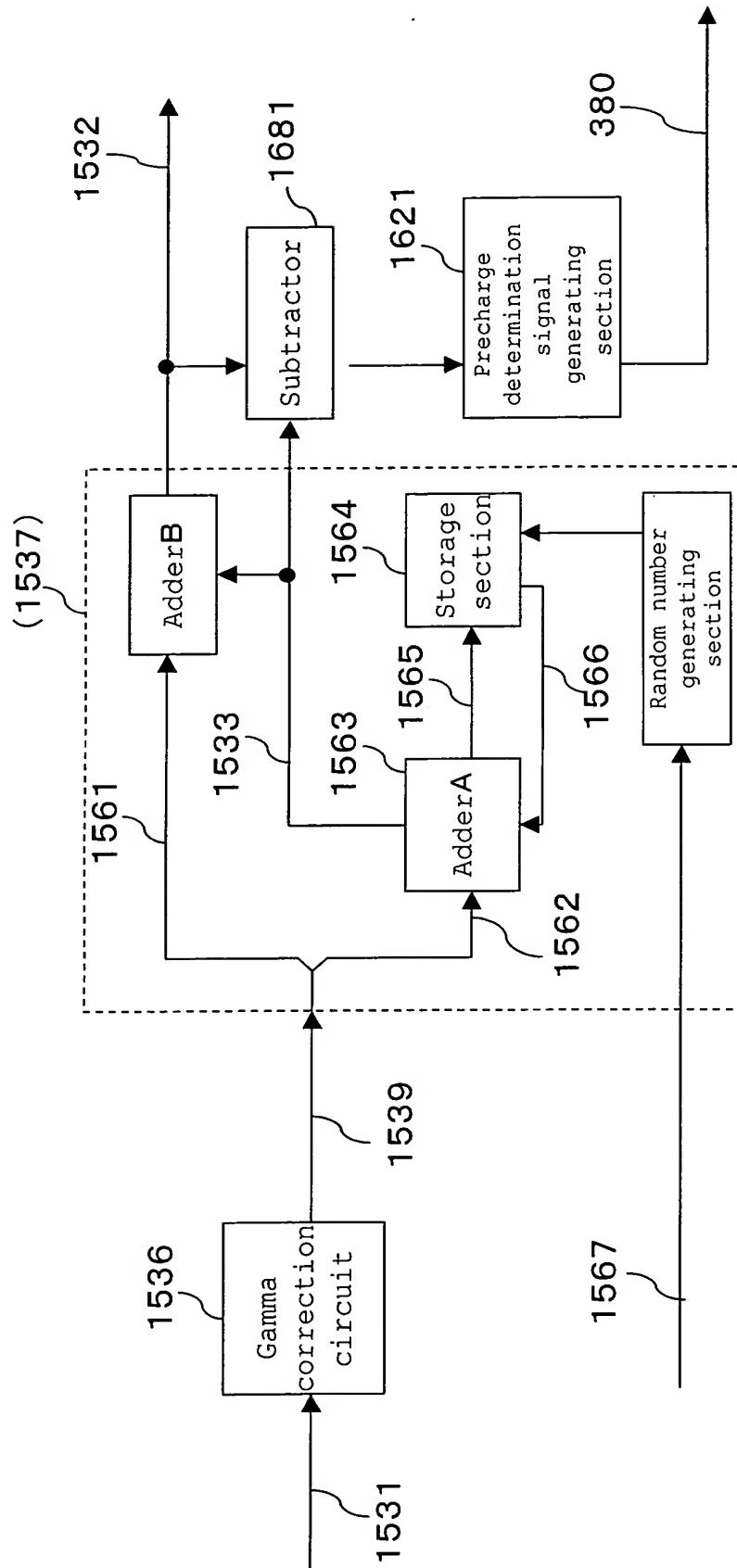
167/190

Fig. 167

Carry signal for preceding row (1533)	Current carry signal (1533)	Determination
0	0	Carry out precharge
0	1	Not carry out precharge
1	0	Carry out precharge
1	1	Carry out precharge

168/190

Fig. 168



169/190

Fig. 169

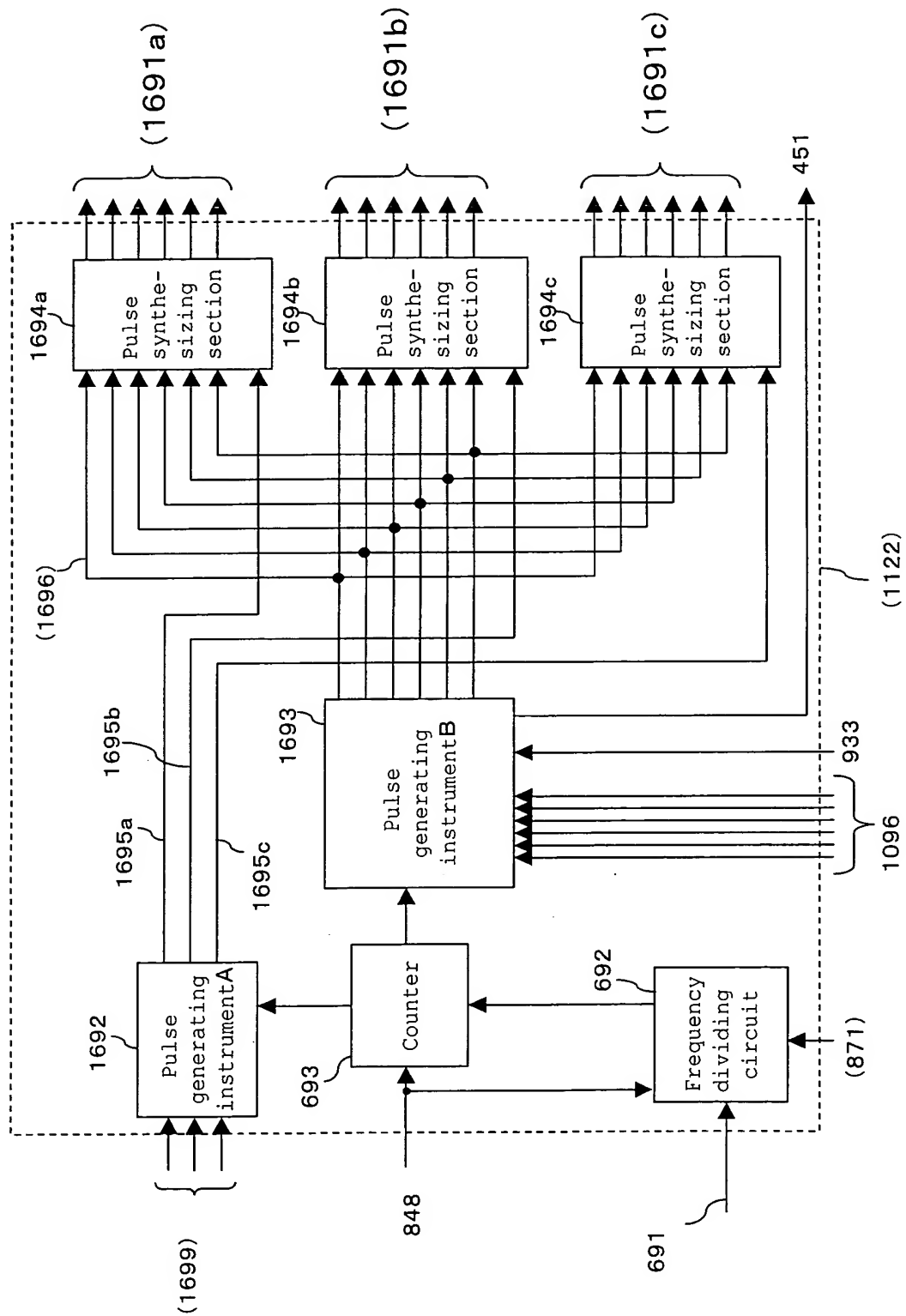


Fig. 170

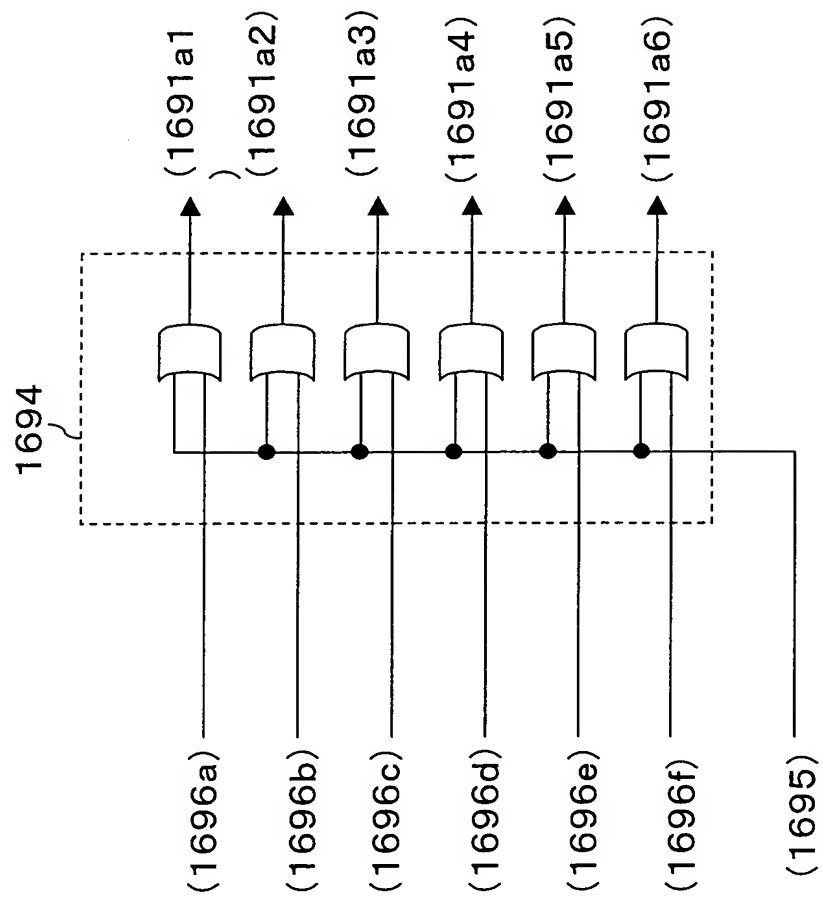


Fig. 171

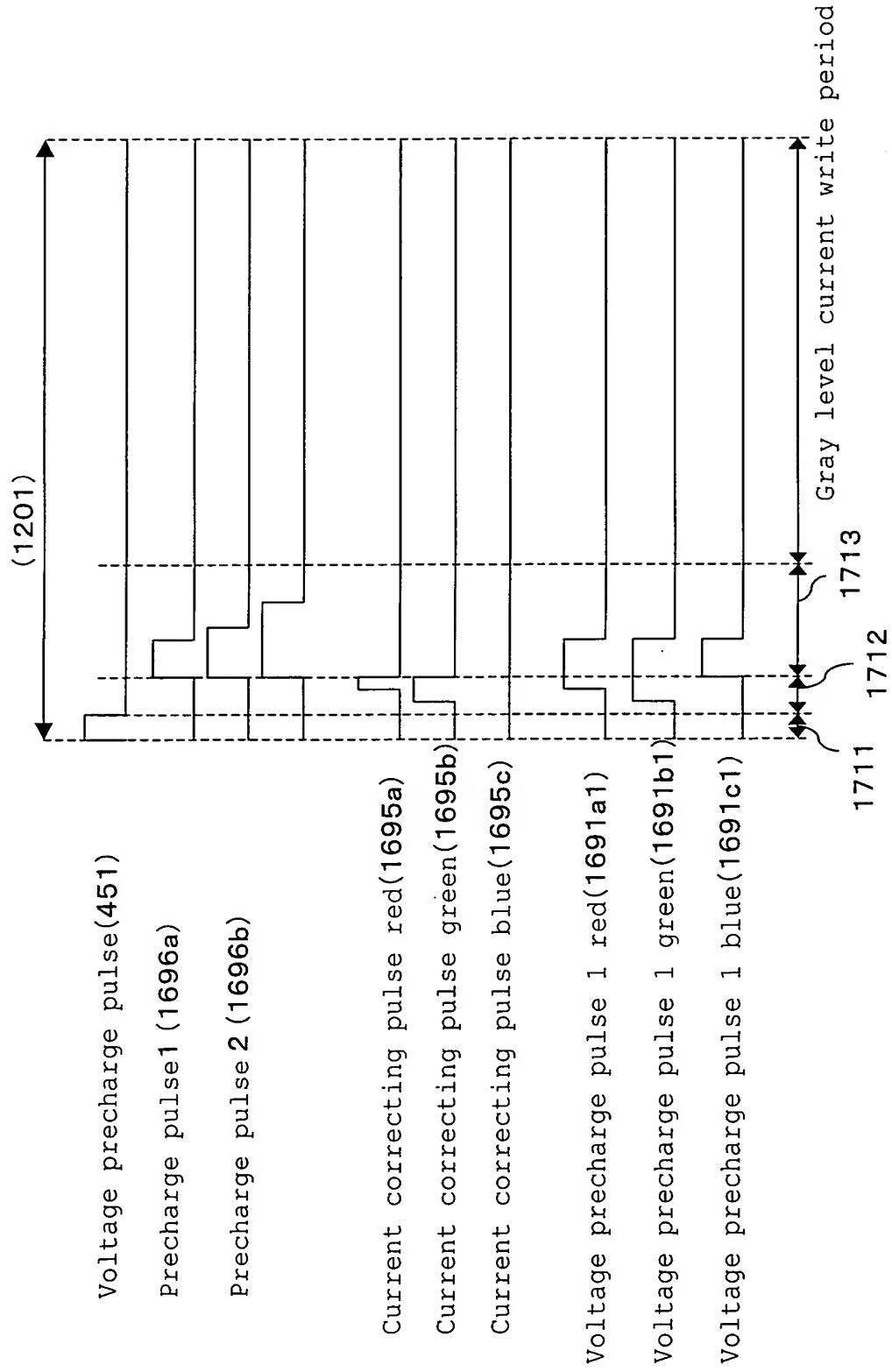
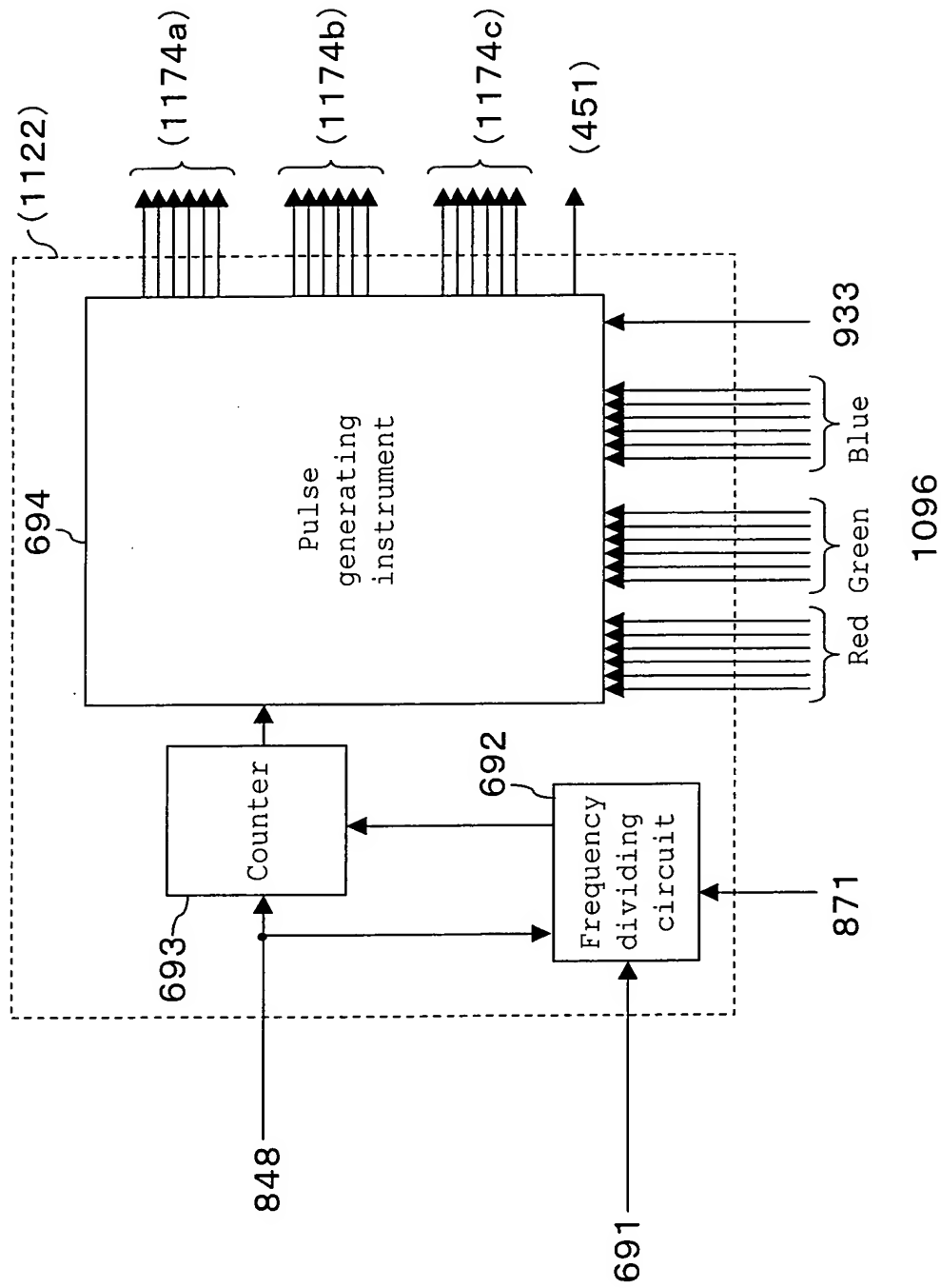
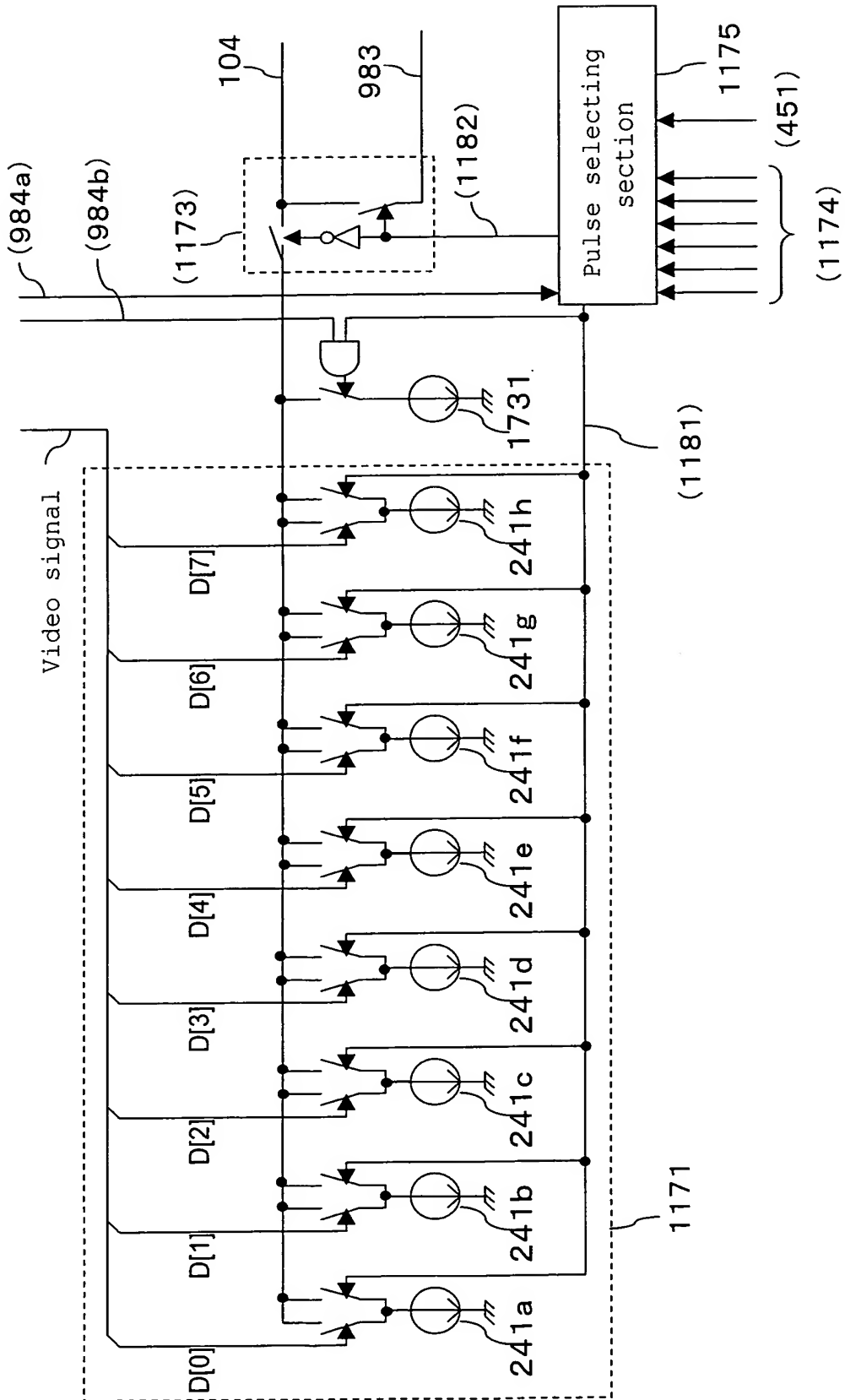


Fig. 172



173/190

Fig. 173



174/190

Fig. 174

Precharge determination line			Operation	
984b	984a		Voltage precharge	Current precharge (current value, period)
X	0	0	Not carry out	Not carry out
0	0	1	carry out	Current sources 241a to 241h used to carry out precharge during input of pulse 1174a
1			carry out	Current sources 241a to 241h and 1731 used to carry out precharge during input of pulse 1174a
0	0	1	carry out	Current sources 241a to 241h used to carry out precharge during input of pulse 1174b
1			carry out	Current sources 241a to 241h and 1731 used to carry out precharge during input of pulse 1174b
0	0	1	carry out	Current sources 241a to 241h used to carry out precharge during input of pulse 1174c
1			carry out	Current sources 241a to 241h and 1731 used to carry out precharge during input of pulse 1174c
0	1	0	carry out	Current sources 241a to 241h and 1731 used to carry out precharge during input of pulse 1174c
1			carry out	Current sources 241a to 241h and 1731 used to carry out precharge during input of pulse 1174d
0	1	0	carry out	Current sources 241a to 241h and 1731 used to carry out precharge during input of pulse 1174d
1			carry out	Current sources 241a to 241h and 1731 used to carry out precharge during input of pulse 1174d
0	1	0	carry out	Current sources 241a to 241h and 1731 used to carry out precharge during input of pulse 1174e
1			carry out	Current sources 241a to 241h and 1731 used to carry out precharge during input of pulse 1174e
0	1	1	carry out	Current sources 241a to 241h used to carry out precharge during input of pulse 1174f
1			carry out	Current sources 241a to 241h and 1731 used to carry out precharge during input of pulse 1174f
X	1	1	carry out	Not carry out

175/190

Fig. 175 (a)

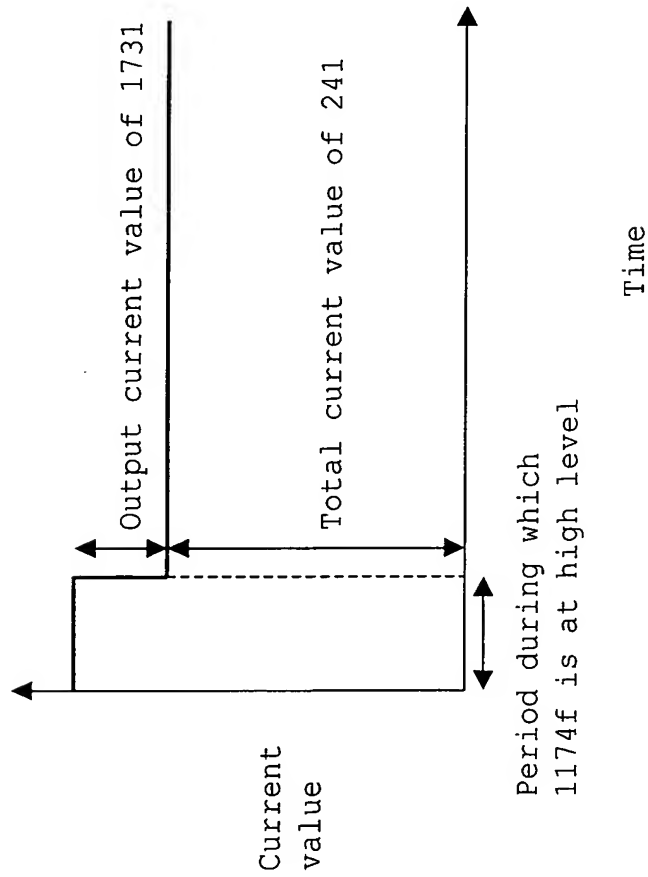


Fig. 175(b)

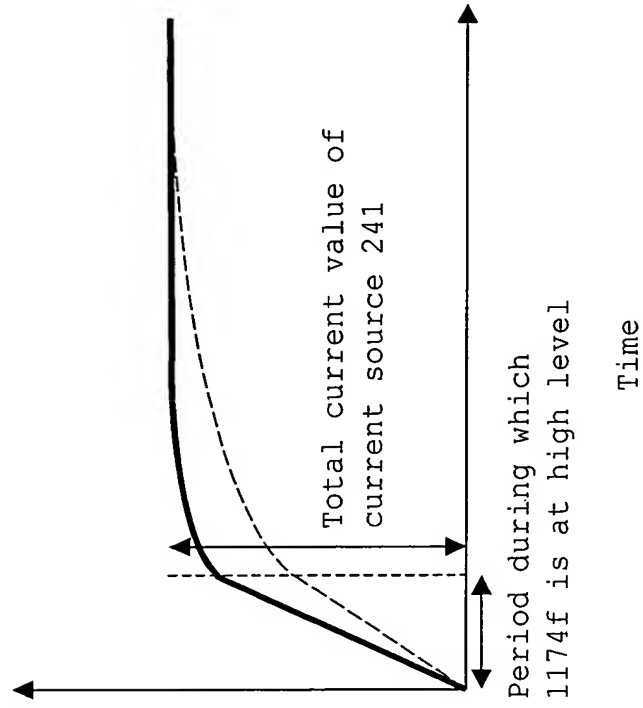
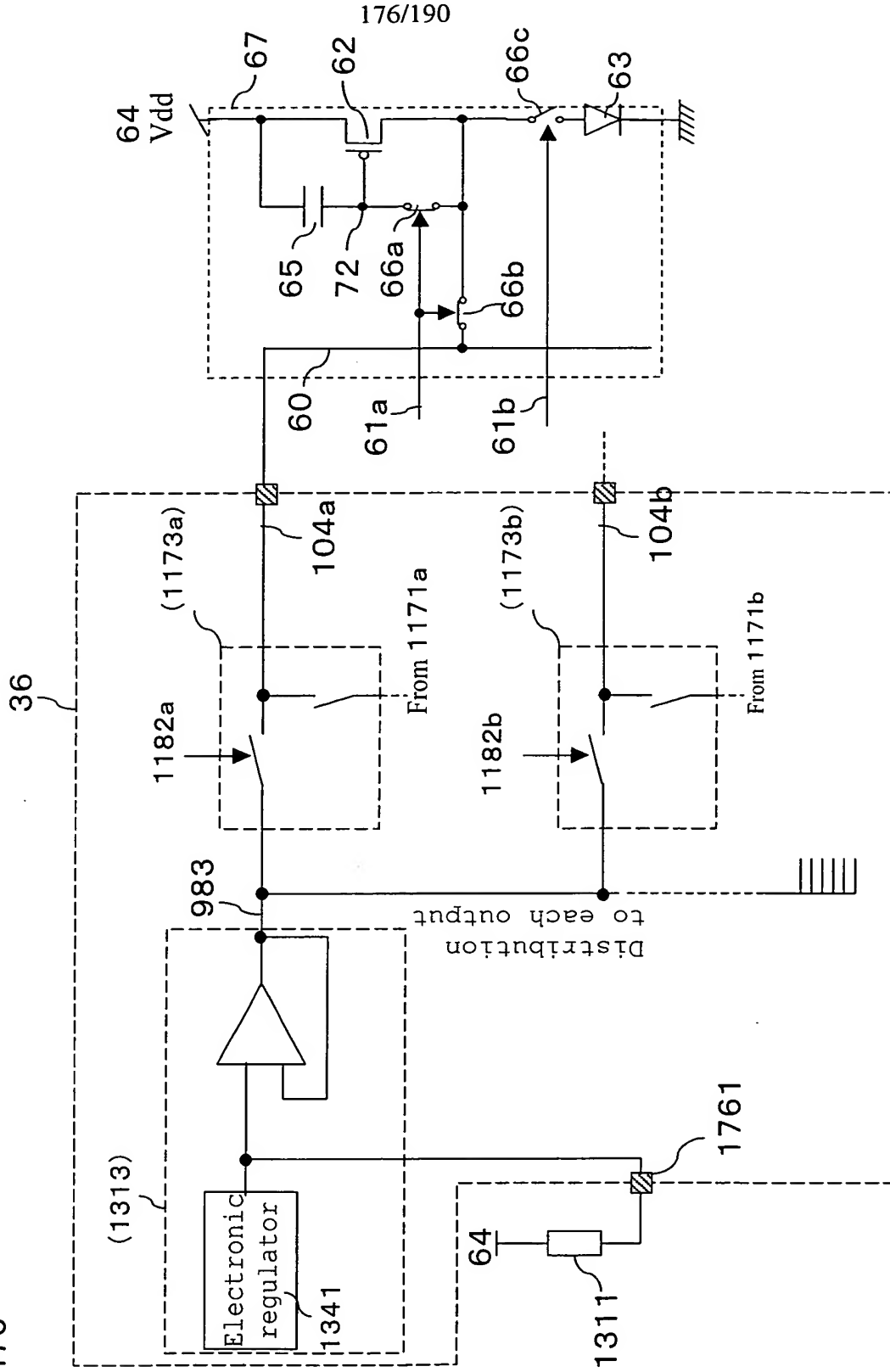
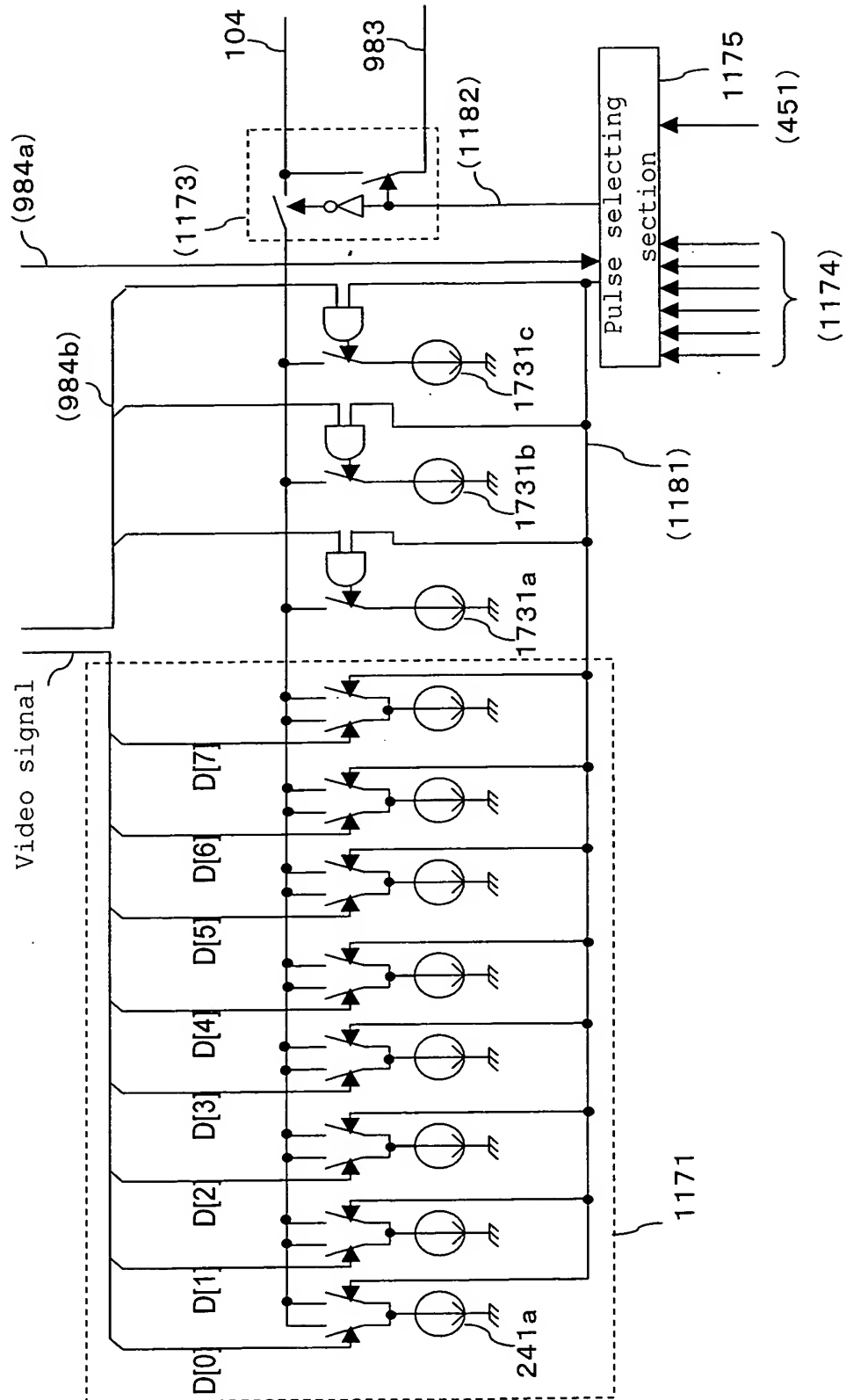


Fig. 176



177/190

Fig. 177



178/190

Fig. 178

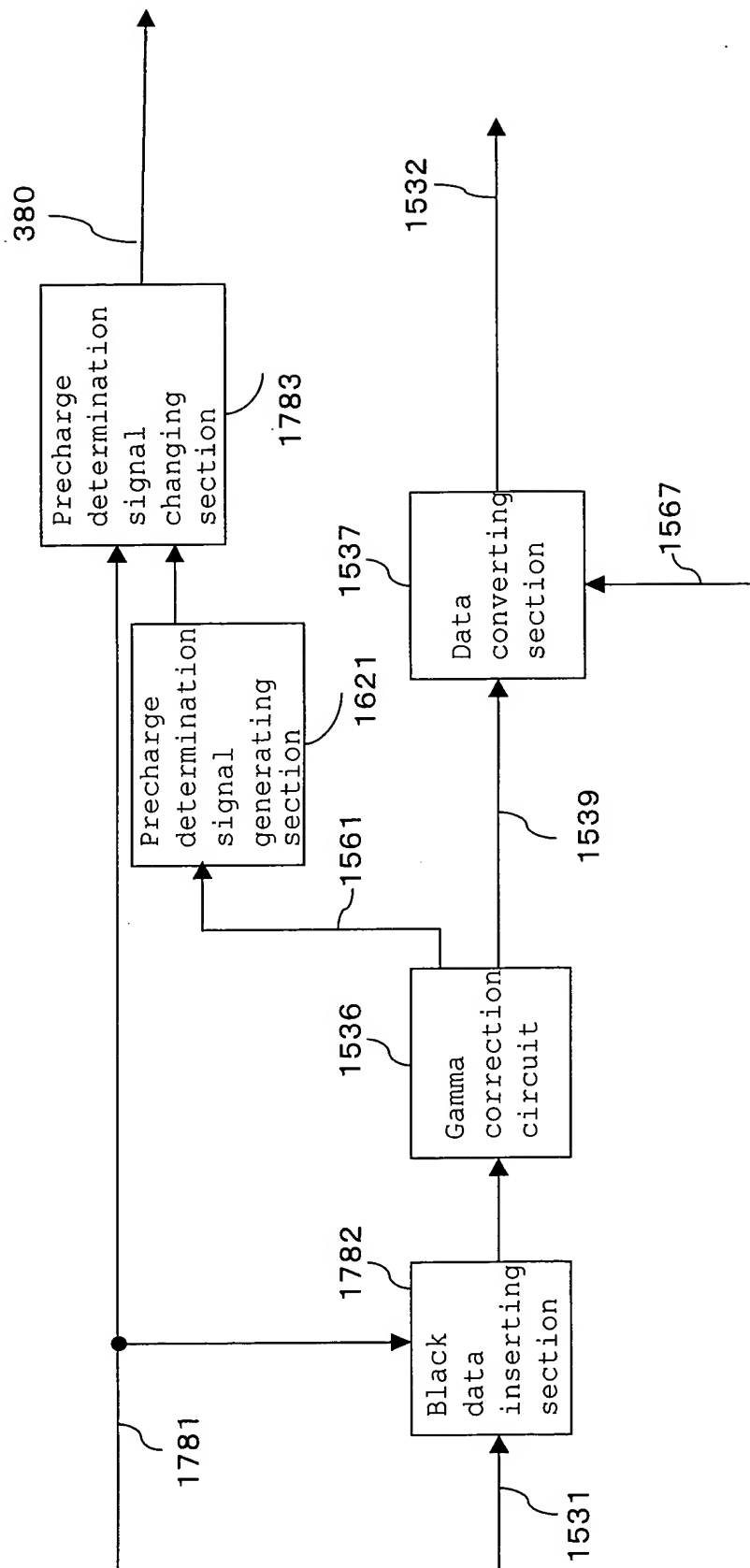


Fig. 179

State of data enable signal	Output from black data inserting section (1782)
Blanking period	Output gray level 0
Display data	Output same signal as input video signal

Fig. 180

State of data enable signal	Output from precharge determination signal changing section
Blanking period	Output "7" regardless of determination for input video signal (signal output required to carry out only voltage precharge)
Display data	Output determination for input video signal

Fig. 181 (a)

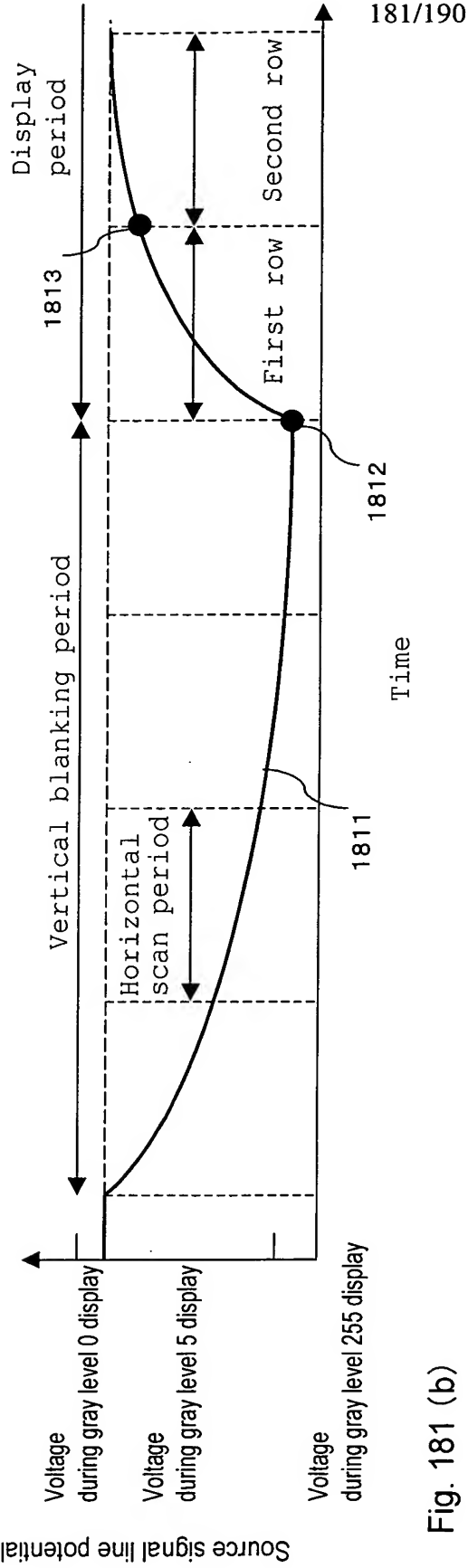
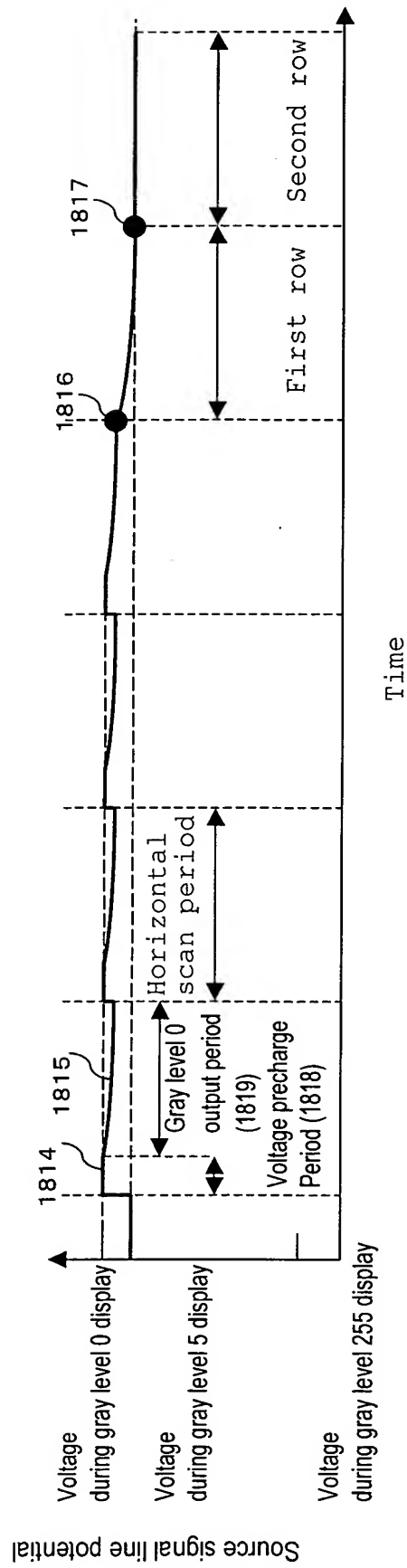


Fig. 181 (b)



182/190

Fig. 182

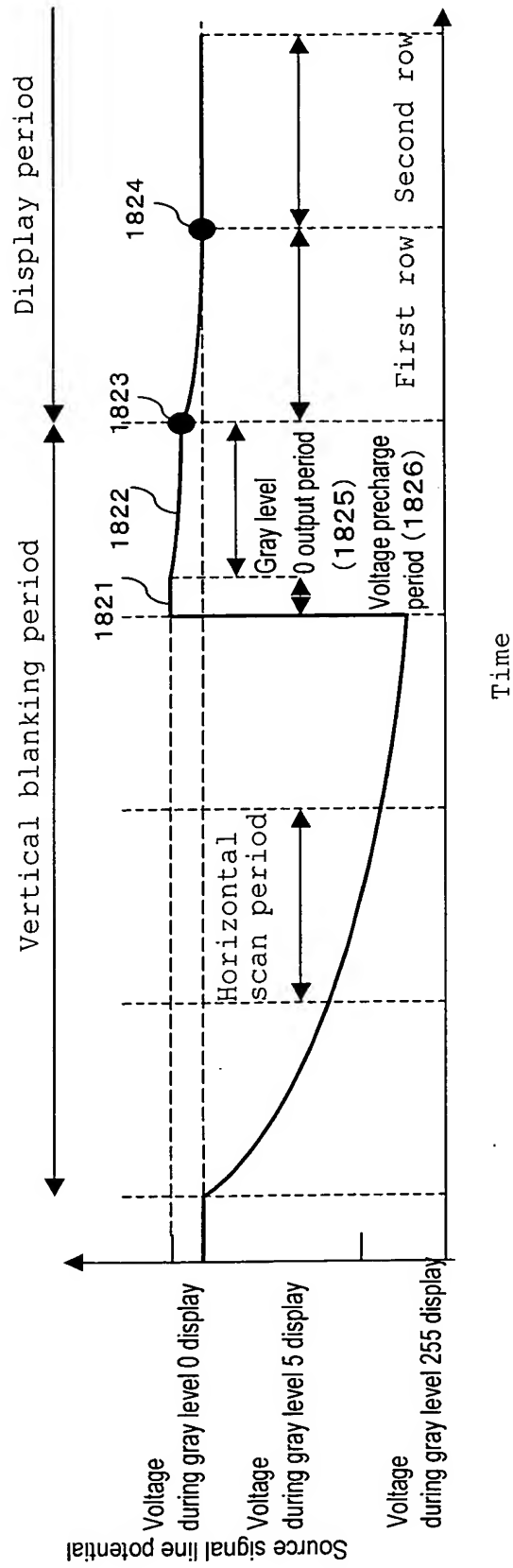
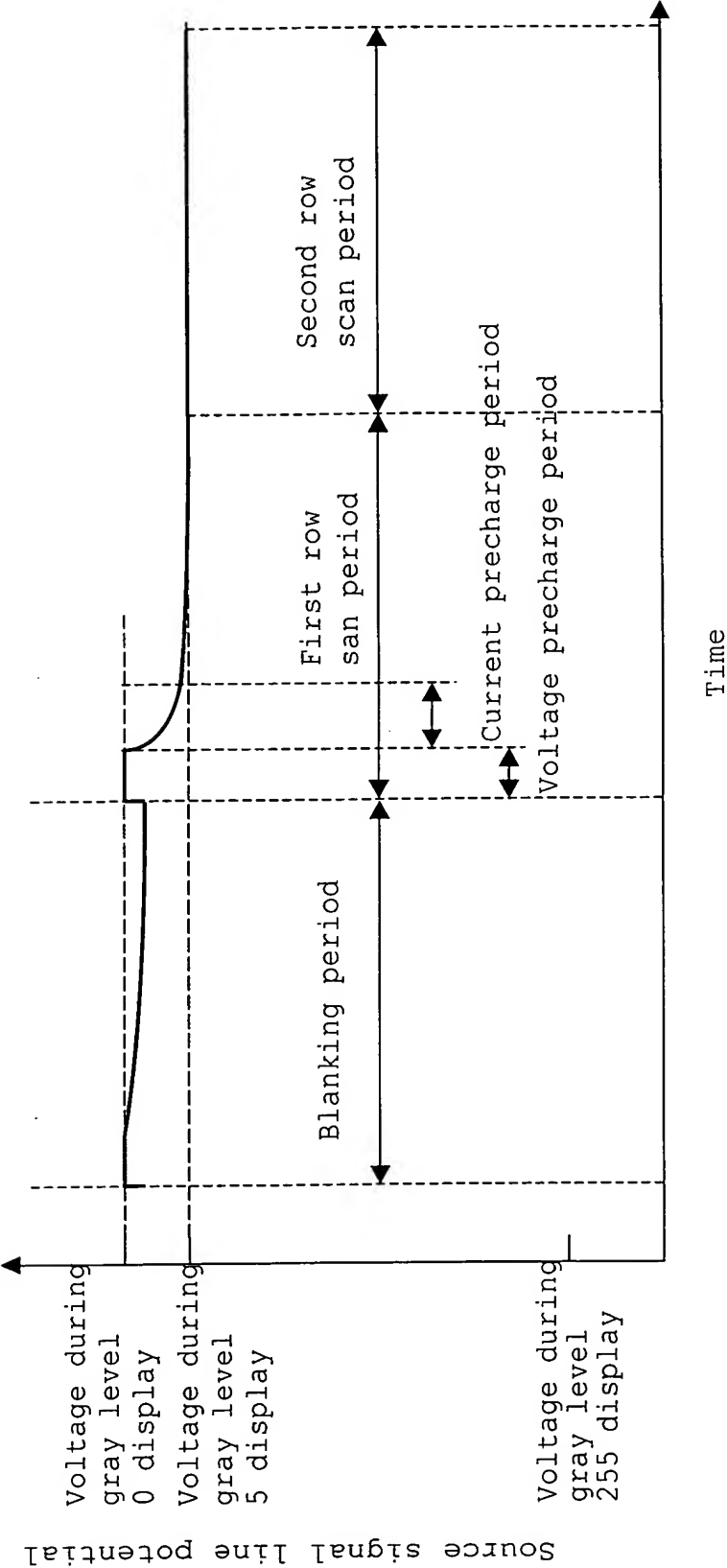


Fig. 183



184/190

Fig. 184

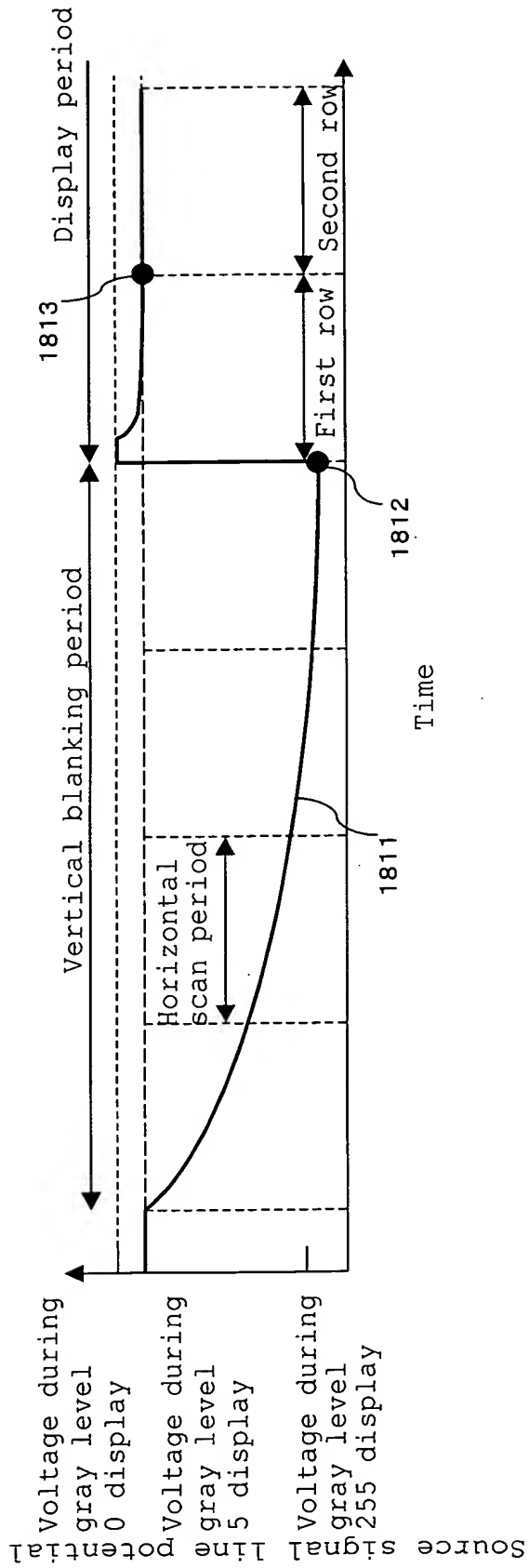


Fig. 185

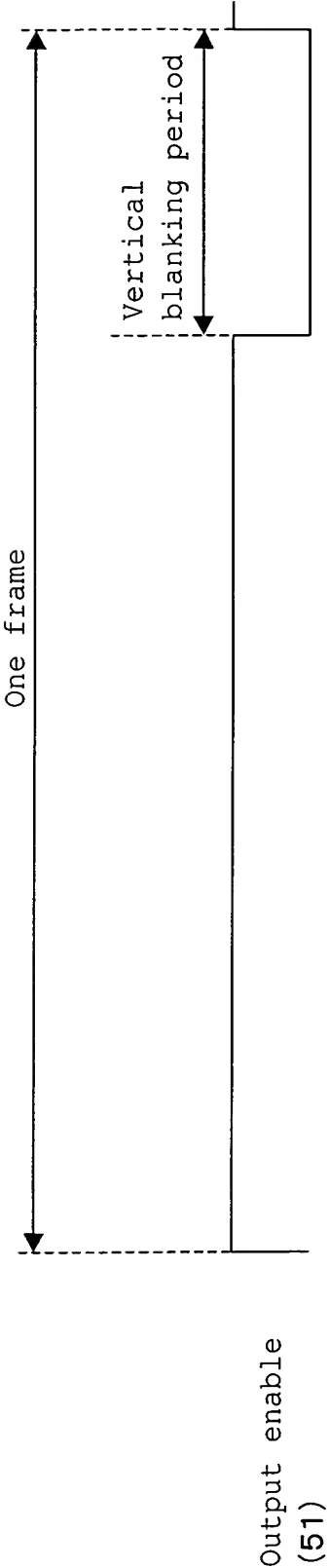
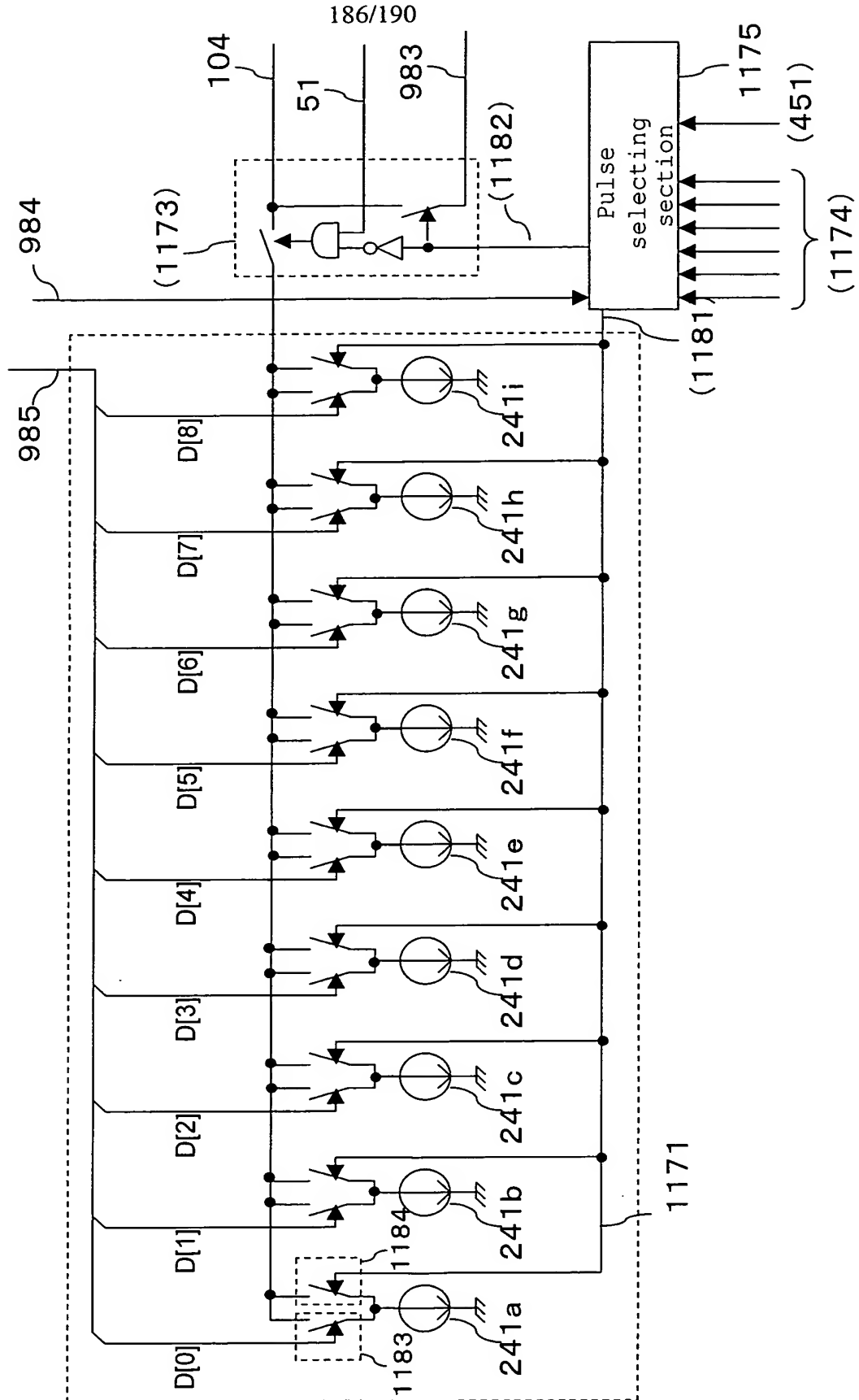


Fig. 186



187/190

Fig. 187 (a)

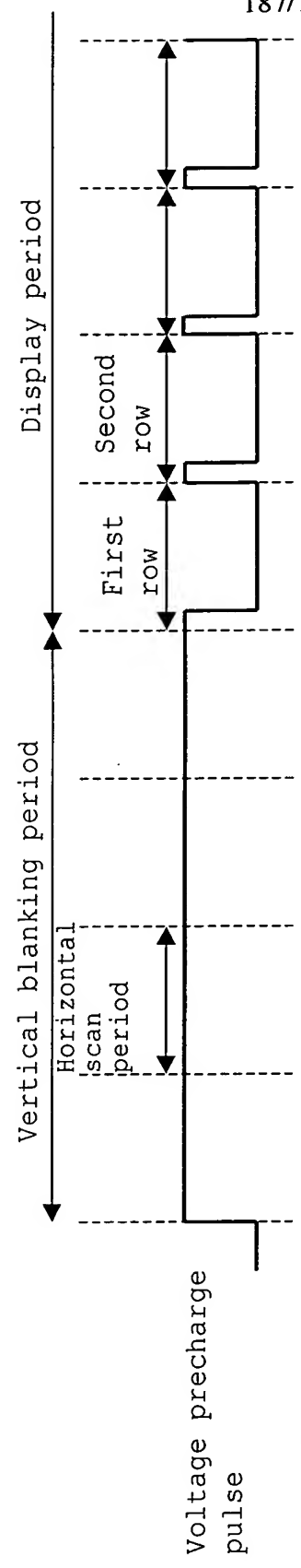
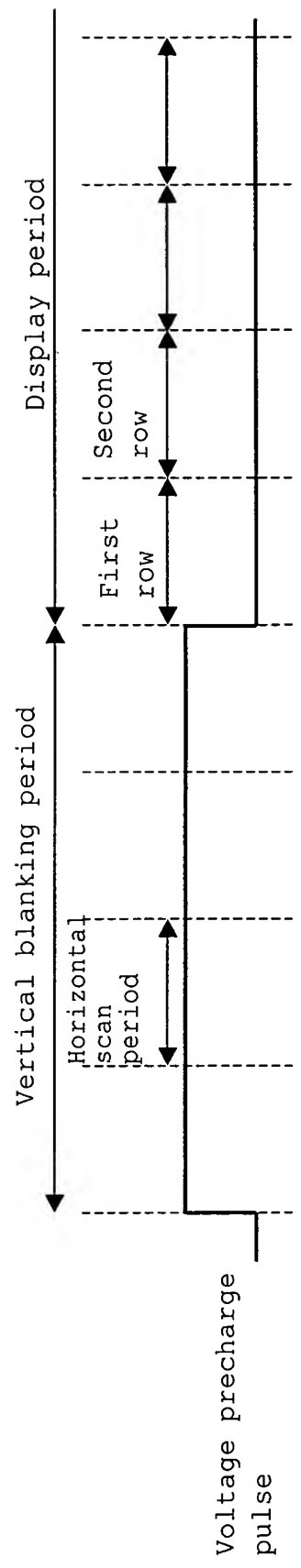
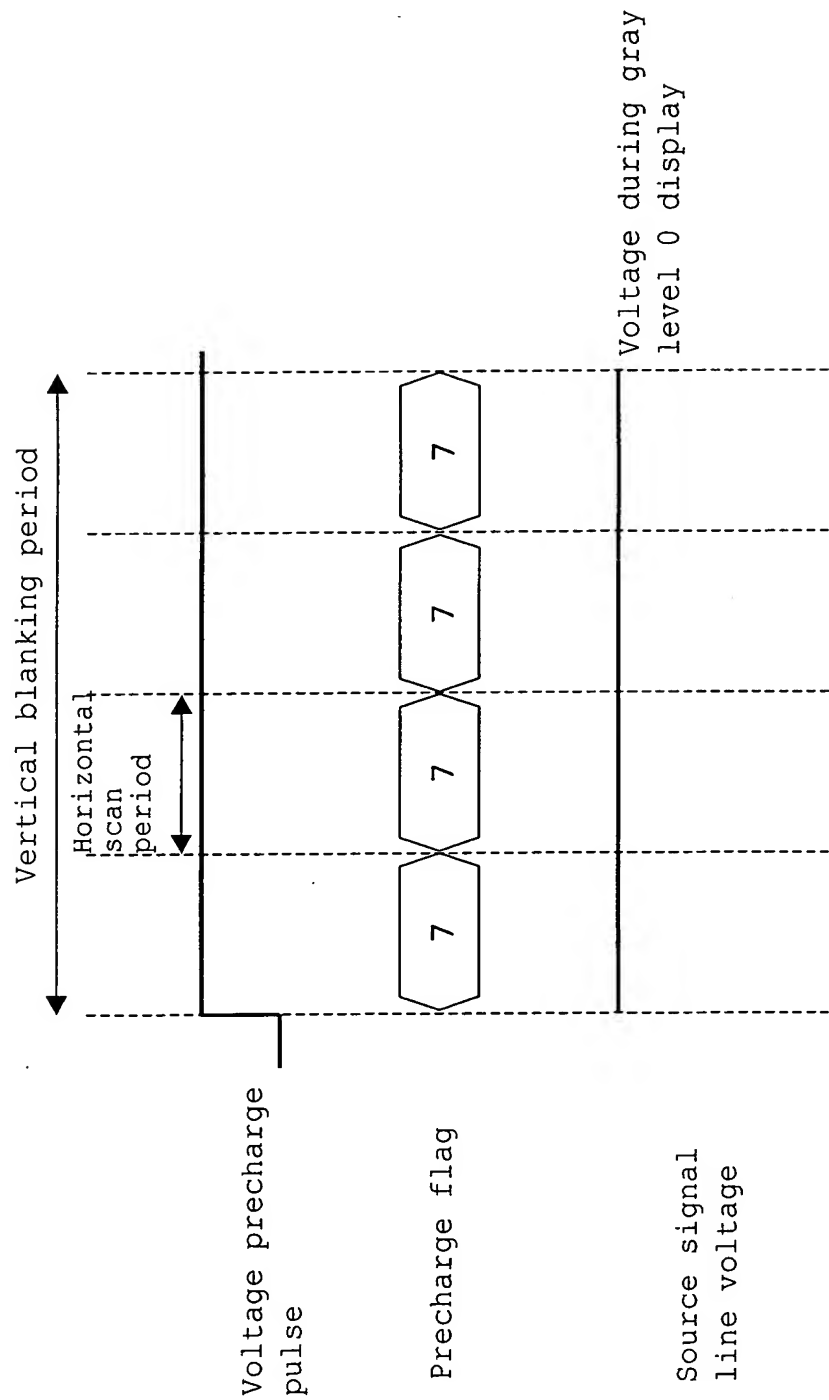


Fig. 187 (b)



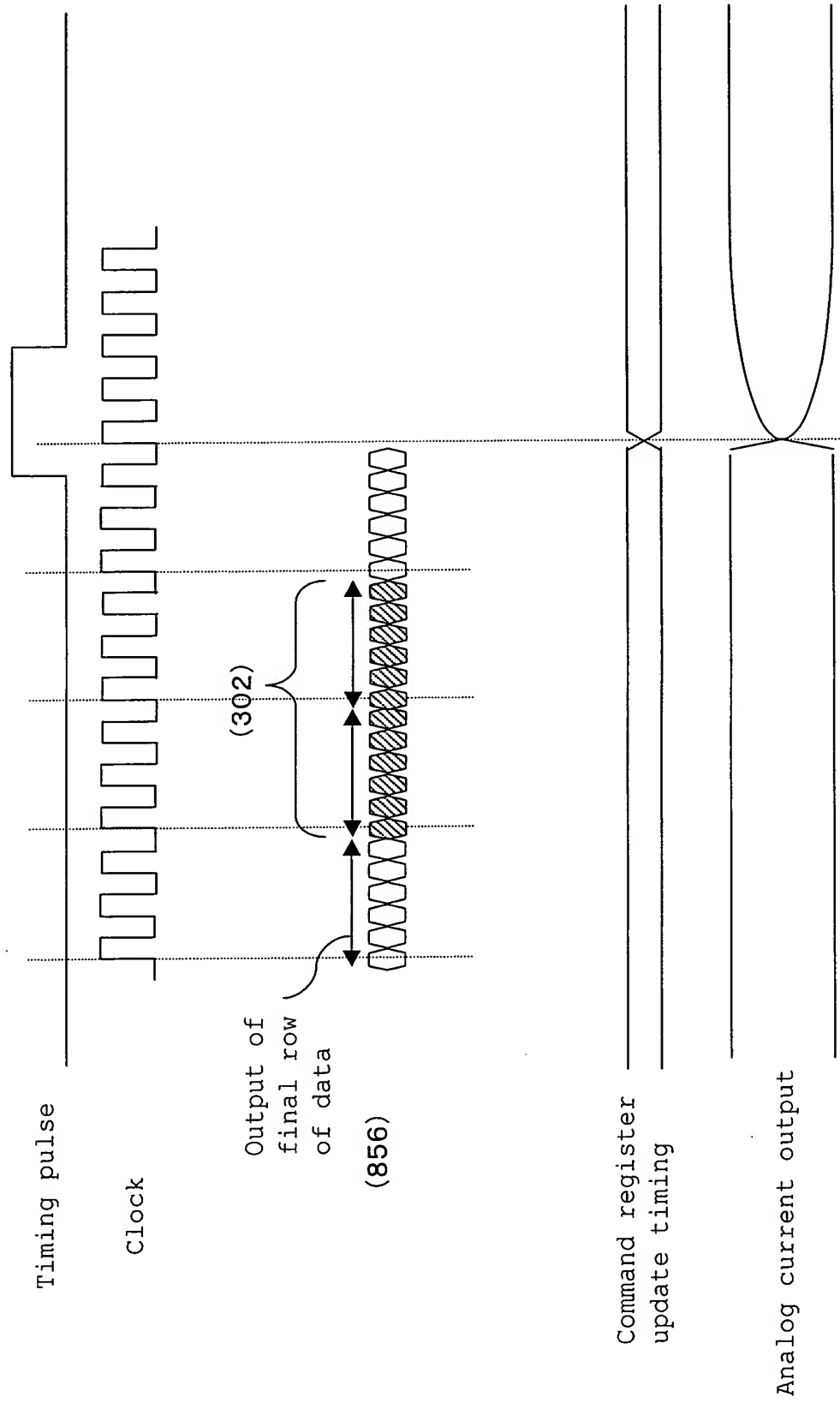
188/190

Fig. 188



189/190

Fig. 189



190/190

